The Gray World: Introducing Research Ethics to Future Professionals in Science and Engineering
This module reports on an outreach project carried out in conjunction with GERESE, Graduate Experience in Research Ethics for Science and Engineering (NSF 0629377). In this project, graduate student mentors developed and presented a workshop in research ethics targeted to pre-university students interested in careers in science and engineering. Students learn to see that a career can be good in two senses, a moral sense and a technical or discipline-based sense. This and other modules are also featured in an EAC Toolkit developed through the NSF-funded project, "Collaborative Development of Ethics Across the Curriculum Resources and Sharing of Best Practices," NSF-SES-0551779.

Note: Write your module for a student audience. To complete or edit the sections below erase the provided textual commentaries then add your own content using one or more of the following strategies:

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Guide to Links

- Faculty Retreat in Research Ethics summarizes NSF grant
GERESE activities.

- RISE2BEST link provides links to other sources essential to
research ethics: Online Ethics,
  ORI, and selected universities

- Ethics CORE is a new NSF project to create a comprehensive
online center to draw together
  materials on research ethics like Online Ethics Center and
U-Mass Scholarly Works/ESENCe project

- Open Seminar course is online component of a special topics
course in Reseach Ethics offered at UPRM
  in 2008.
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Graduate Experience in Research Ethics for Science and Engineering

GERESE
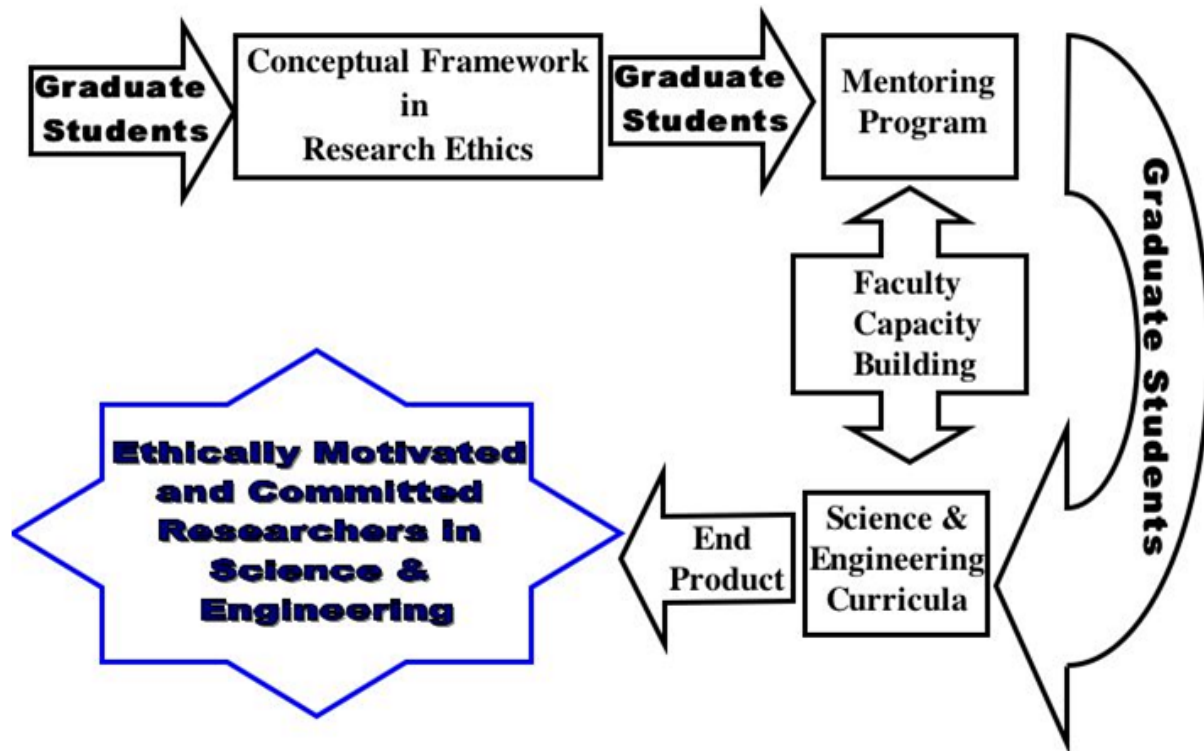
Elements of GERESE project leading to ethically empowered graduate students.

GERESE, an NSF grant, developed and tested a hybrid approach to research ethics, one that sought to identify and integrate synergies between stand-alone courses and an organized series of ethics across the curriculum interventions. Working with a conceptual framework in research ethics, where issues are derived from a double axiological axis, project investigators developed a workshop series in research ethics and also experimented with one-hour and three-hour courses. Faculty development workshops identified key issues in research ethics and carried out activities through which faculty members assessed different aspects of GERESE. A final retreat held August 2009, realized module and case development

activities which were mapped onto the research ethics issues identified earlier. The result is an Ethics Incubator published in the Connexions module, "Faculty Retreat in Research Ethics--Modules and Issues. (See link above.)

A Presentation: The Gray World

Graduate students at UPRM, Erika Jaramilla and Morgan Echeverry, developed a presentation that introduces students to general ethical issues as well as more specific issues in research ethics. This presentation introduces ethics in the context of choosing a career; ethics consists of the proper exercise of choice in this and other situations. Student-produced video vignettes used to introduce key issues in research ethics have been seamlessly integrated into this presentation. Using clear images and forceful descriptions, this presentation introduces pre-university students to a range of ethical issues that arise in research in engineering and science. Several distinct pedagogical strategies are used to bring about a transition from black and white situations (which help students hone in on key concepts and distinctions) to the "grey world" where students are exposed to real world moral complexities.

The Gray World--Presentation in Spanish
https://cnx.org/content/m37142/

Gray World Presentation for Graduate Students
https://cnx.org/content/m37142/

Gray World Presentation (SEAC Nov 5, 2011)
https://cnx.org/content/m37142/

RCR Concept Table
https://cnx.org/content/m37142/

Research Ethics Video Vignettes

Students act out different scenarios in research ethics to provide black and white examples of different issues. Among those covered are plagiarism,

falsification, fabrication, environmental responsibility, mentoring, and conflict of interest.

Fabrication
Video Vignette Fabrication
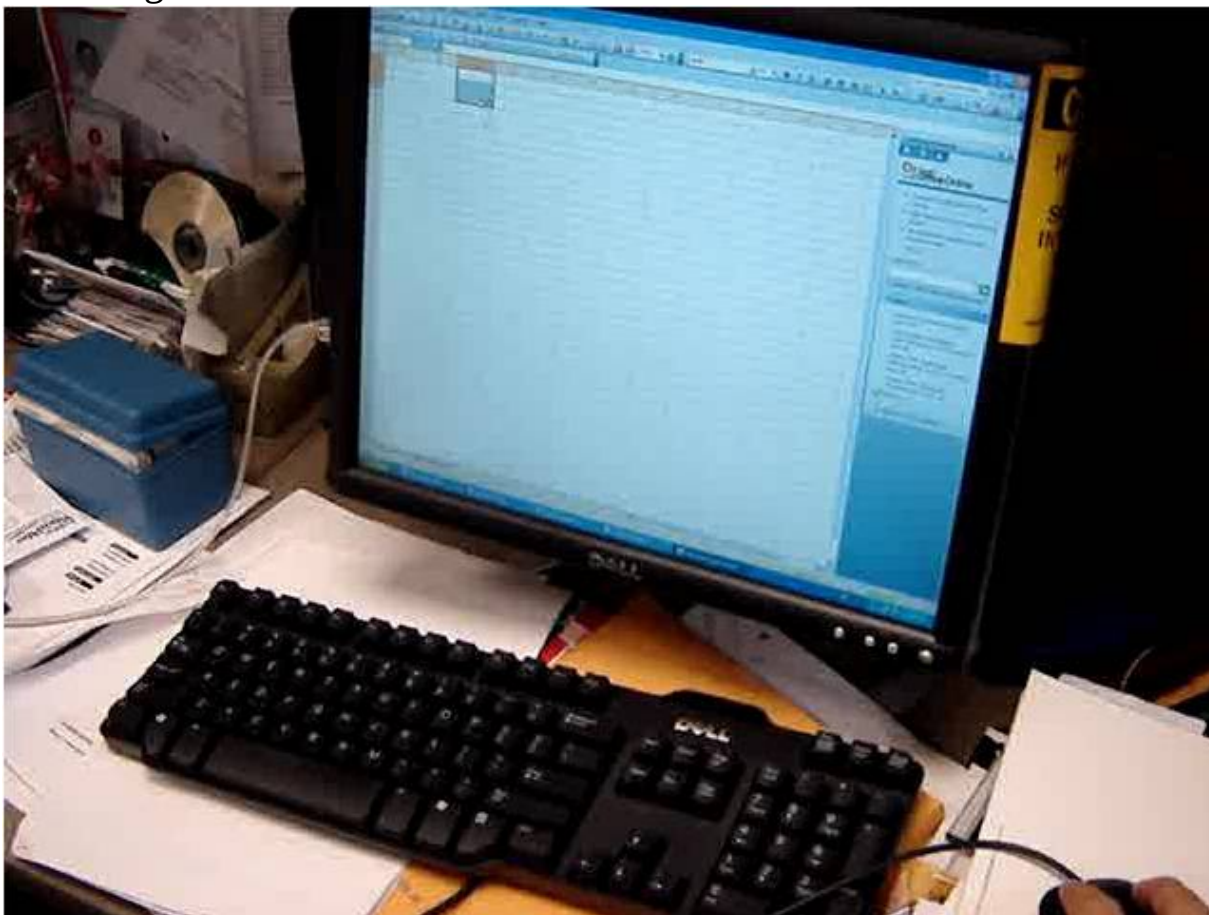
Student fabricates data to make meet teacher's expectations.

Falsification
Falsification
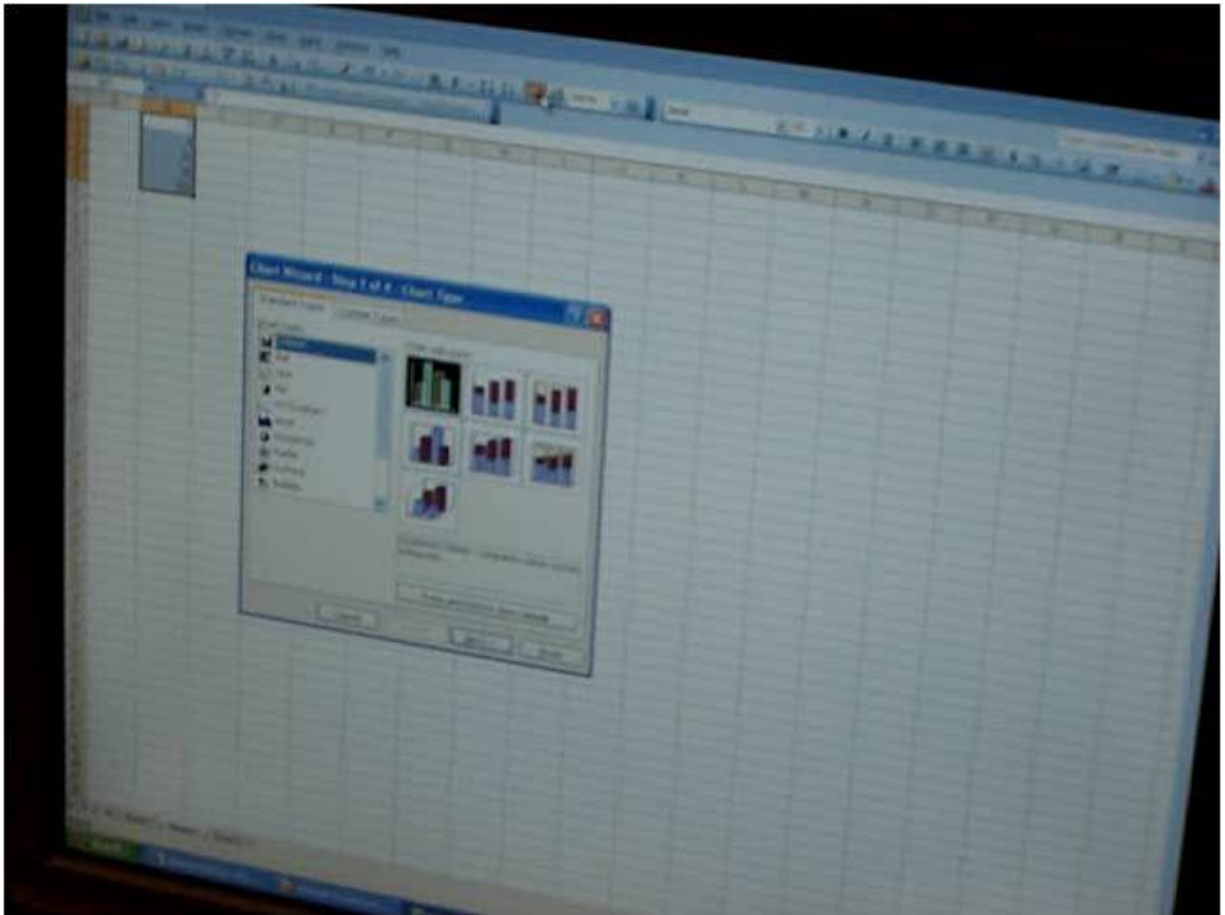
Student falsifies data to make data spread sheet meet teacher's expectations.

Throwing Out the Trash

Car turns corner, window opens, and trash flies out in a graphic display of environmental irresponsibility.

Moving from the Black and White to the Gray

A Layered Case

This layered case helped students move from black and white issues to gray issues.

A pharmaceutical company discovers a treatment for HIV-AIDS patients which controls the symptoms and, in some cases, cures the disease **Complicating circumstances are layered in.**

- The production process produces toxic chemical byproducts.
- To clean these up properly would cut sharply into the company's profits so it dumps them illegally but temporarily into an aquifer that supposedly nobody uses.
- The medicine works so the company's product saves lives. But is the cost--the contamination of an aquifer--really worth the cost?

Assessment Strategy

The assessment strategy used by workshop developers combines qualitative with quantitative assessment. Closed questions help measure changes in student perception and knowledge pertinent to ethics and research ethics. Open-ended questions help assess problem solving and concept prototyping skills.

Pre and Post Test for Assessment
https://cnx.org/content/m37142/

Mapping Assessment Activities onto Bloom Taxonomy
https://cnx.org/content/m37142/

Results

Assessment Results

Nombre de la Escuela	Fecha	Núm. part.	Conocimientos	Percepción	Análisis Caso	Concepto Ética	Video	Eval. General del taller
STI-2007	Junio 27 2007	16	26%	19%	NA	NA		NA
UBSM-Ponce	Junio 28 2007	27	26%	16%	NA	NA		NA
CROEM	Marzo 3 2008	19	14%	39%	0.47-1.18	1.5-2.05		90.4%
UBSM-S.Germán 2008	Junio 30 2008	32	24%	30%	0.59-1.45	1.63-1.72		94.7%
STI-2008	Junio 26 2008	18	21%	21%	2.22-2.44	0.23-1.31		90.3%
UBSM-Ponce yB	Junio 17 2008	41	20%	33%	0.56-1.89	1.22-2.17		94.33%
BETTeR-IC 2008	Julio 19 2008	32	18%	29%	1.11-1.21	2.42-2.54		83.33%
SESO 2008	Diciembre 8 2008	18	35%	44%	1.5-2.78 1.9-2.33	0.67-1.78 0.76-1.33		78%
Inés María Mendoza	Diciembre 10 2008	38	6%	14%	NA	NA		48.3%
SACNAS	Marzo 25 2008	10	12%	27%	NA	NA		85%
PR-LS-AMP	Octubre 21 2008	15	13%	21%	2.43-2.93	1.18-1.91		
Mc Nair	Noviembre 12 2008	11	13%	25%	2.27-2.45	0.75-1.75		
UBSM-Ponce 2009	Julio 2009	25	13%	24%	0.63-1.5	1-1.32	Plagio, falsificación	86.3%
STI 2009	Julio 3 2009	18	7%	25%	2.17-2.61	0.86-1.21		90%
BETTER-IC	Julio 2009	32	26%	30%	0.57-1.33	1.3-1.8	Plagio, conflicto de interés	87.3%
		352						

This table summarizes the assessment results for the 352 students who participated from 2007-2009. These are broken down into ethical perception, ethical knowledge, and rubric graded results on the open-ended definition and case analysis questions.

Ethical Issues in Graduate Research
(Caution! This module is being published in an incomplete, preliminary version. Later edited and fuller versions will follow.) "Graduate Education in Research Ethics for Scientists and Engineers" is a project funded by the National Science Foundation (SES 0629377) to design a pilot program in research ethics for graduate students in science and engineering. This project is built around three workshops: (1) a Graduate Awareness Workshop introduces students to fundamental ethical issues in research, (2) a Moral Deliberation Workshop acquaints students with the skills of moral deliberation, (3) a Case Analysis Workshop uses realistic scenarios to allow students to practice decision-making an problem-solving in research ethics, and (4) students present their decision-making and problem-solving skills in a capstone activity, an Ethics Banquet, that consists of poster presentations on cases in research ethics. This module is a derived copy of the first workshop, the Graduate Awareness Workshop, written for business administration students or students in the professional and occupational areas who will be doing research in a market-driven environment. It links to the Open Seminar project, also funded by the NSF, which provides exercises, modules, activities, and resources pertinent to the study and teaching of research ethics. It also works closely with the Belmont Report, a wonderfully concise document that offers principles and practical applications designed to undercut the paralyzing theoretical and ideological debates that often accompany an area like research ethics. This module has been developed through Connexions as a part of the EAC Toolkit project, NSF SES 0551779.

Module Introduction

Graduate Awareness Module

This module presents the ethical issues and concepts associated with research in graduate school. Its content and exercises focus on business research, that is, research carried out in business organizations and research carried out in graduate programs in business schools. You begin with three cases: Tuskegee, Enron, and Baltimore. The first establishes the need for research ethics. The second introduces complexities that market-driven activities bring to research. The Baltimore case poses the question, not of whether market forces distort and deflect scientific research, but of whether

government and legal forces conspire to distort and deflect the exercise of scientific research skills. After looking at these cases, you will examine the Belmont Report and the basic moral principles and responsibilities in research ethics that it clearly outlines. These principles stand up remarkably well when carried to the realm of business; but there is still a sense in which they need reformulation and clarification to become operative in the context of the different moral ecologies provided by business. Third, you will apply the principles of the Belmont Report to famous (and notorious) research carried out in social psychology on obedience to authority. In a role-playing activity, you will imagine that you are a member of an IRB (Institutional Review Board) charged with evaluating Milgram's research proposal that justifies the experiments he is about to carry out to generate information on how far normal individuals will go, against conscience, on the basis of authority. Someone role-playing as Milgram will present the experiment's protocol, estimate the damage it will bring to the participating human subjects, and outline the expected results. You will use the principles of respect, beneficence, and justice as outlined in the Belmont Report to evaluate Milgram's proposal and decide if the experiment, as outlined, should take place. Finally, you will have a chance to reflect on a series of issues that arise in research carried out in the area where markets, technology, and government intersect. How does competition drive, direct, and even detect research? Does the profit motive distort or corrupt research results? Do markets motivate, filter, or deflect research and progress in scientific and technological research? Can undue or excessive interference by the government undo research efforts?

Get Started--Take the Pre-Test
This pre-test in research ethics—not really a test—consists of short scenarios accompanied by three questions: (1) Is it ethical? (2) Is it common or realistic? (3) Is it controversial? Answering these will help you to start thinking about research ethics issues. On some scenarios you will agree with your classmates and teacher. On others you won't. Try using three simple ethics tests (reversibility, harm-benefits, and publicity) to provide more common ground upon which to build consensus. And don't despair. Coming to a thoughtful agreement on ethical issues is difficult but well worth the effort.
Research Ethics Pre Test

https://cnx.org/content/m31972/

Clicking on this figure will open the Research Ethics Pre Test. It consists of a series of short scenarios designed to get you thinking about some of the ethical issues you will encounter during your graduate studies.

GERESE Research Ethics Pre Test
https://cnx.org/content/m31972/

Issues Table
https://cnx.org/content/m31972/

Syllabus for Business Government Society
https://cnx.org/content/m31972/

What you need to know

The Tuskegee Study

- Those horrified by the experiments carried out by Nazi scientists and doctors on defenseless concentration camp prisoners were placated only by the reassurance that "it couldn't happen here." ("Here" for the purpose of this module would be the United States, including Puerto Rico.)
- News stories published in 1972 detailing the Tuskegee experiments carried out in Mississippi soon displaced this consoling belief. As it turned out, not only could these things "happen here" but had been happening here for forty years.

- Inaugurated in 1932, the Tuskegee study examined the long terms effects of the disease syphilis in Black men. Even though penicillin was widely used (and successfully used) as a treatment for this disease, such treatment was withheld from the experiment's subjects to allow it to go to its logical and biological conclusion.
- The experiment continued until 1972, when Peter Buxtin with the U.S. Public Health Service (the agency sponsoring the experiment) blew the whistle on the experiment to reporter Jean Heller. According to Wikipedia, "[B]y the end of the study in 1972, only 74 of the test subjects were alive. 28 of the original 399 men had died of syphilis, 100 were dead of related complications, 40 of their wives had been infected, and 19 of their children had been born with congenital syphilis.
- The outrage generated by this study led to the formation of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. This commission wrote the widely known and respected Belmont Report, summarized below, that outlined the moral status, considerability and rights of human subjects in the context of scientific research. It developed protocols to recognize and respect these moral considerations and rights by requiring that those conducting publicly funded research have their research proposals reviewed by Institutional Review Boards.

This short profile on Tuskegee has been compiled with materials taken from Wikipedia (http://en.wikipedia.org/wiki/Tuskegee_syphilis_experiment) and the Western Michigan Website on ethics linked above (http://www.wmich.edu/ethics/old-site/ESC/cs3.html) both accessed March 15, 2011. Jorge Ferrer also discusses the Tuskegee case in **Deber Y Deliberacion: Una Invitacion a la Bioetica**, Mayaguez, PR:CePA.
The Enron Case

- Enron hardly seems appropriate for a module in research ethics. It has been presented as a cautionary tale of what happens to Harvard Business School Graduates who give smart alec remarks during student interviews. (Jeffrey Skilling, when asked if he was smart, supposedly replied, "I am f___ing smart." The moral of this cautionary

tale: don't be arrogant and hubristic or you will be brought down and humbled like Enron's "smartest guys in the room.")

- This is good advice but it only gets us started toward a more profound appreciation of the moral complexity of this case. For example, Malcolm Gladwel distinguishes between a puzzle and a mystery and asks which one applies to Enron.
- A puzzle requires more information if it is to be solved. If a puzzle cannot be solved, then it is because someone is withholding crucial information. In determining Skilling's punishment and jail sentence, many testified that Skilling withheld crucial financial information from them pertinent to Enron's pending failure. He sold Enron stock but they didn't because they didn't have the inside perspective. They could have solved the Enron puzzle (and sold their stock before it crashed) had they been able to access the same information available to Skilling.
- But if Enron is a mystery, and Gladwell more than hints at this possibility, then it doesn't require more information to be solved. Rather, it requires intelligent and skilled financial experts to study, structure and frame the information already out and turn it into a coherent story. (Intelligence experts are trained to do this by interpreting the chatter that goes on between terrorists to try to build a picture of whether they are planning an attack.) The students at Cornell university studied information publicly available on Enron. On the basis of this (and not cloak-and-dagger investigative reporting), they recommend selling Enron stock because it was overvalued. For them Enron was a mystery. All it needed was for someone to pour over all the information available and tell a coherent story.
- This is important to research ethics because much of research in business falls in one or the other of these categories. Furthermore, responsibility is assigned differently depending on whether the situation offers a puzzle or a mystery. If Enron was a puzzle, then Skilling, Lay, and Fastow were likely guilty of a cover-up. If Enron was a mystery, then the blame falls on those who should have been able to put together the story of Enron's failure based on the information already available.

Enron Exercise

1. Give an argument on why the Enron Case is primarily a puzzle. How did Skilling, Fastow, Lay go about covering up the vital information?
2. Given an argument on why the Enron is primarily a mystery. If the information was already out there, why were financial experts unable to see it? What was the story they should have put together to make sense of the information already publicized?
3. In working toward your answers to 1 or 2, consider whether energy futures, mark-to-market accounting, and Special Purpose Entities were financial devices or tools that were be put to good use. (Could they be treated, for example, as value-neutral technologies?)

Eight Important Points to Enron Case

1. Houston Natural Gas merges with InterNorth to become Enron. This takes place in 1985.
2. The Valhalla Scandals nearly did Enron in early in the career of both Lay and the corporation. Enron. Maverick traders risked everything on a series of shaky deals. Muckleroy, former Enron official, out-bluffed the market to ride out the financial crises.
3. Lay formulated an exciting new idea: trading energy futures, that is, deregulating the energy market and trading energy futures in the same way that agriculture futures are traded. To bring about deregulation in the energy market, Kenneth Lay became a formidable Washington lobbyist who benefitted from close ties to the Bush family (President George H. W. Bush and President George W. Bush). (Take some time to think about some of the free-market arguments that Lay made to convince government agencies to de-regulate the energy market.)
4. Lay hires Skilling who at the time was an adviser for the McKinsey group. Skilling was brilliant (called "incandescently brilliant by admirers), a Social Darwinist (distinguish Darwinist from Social Darwinist), and a risk taker. While these were admiral qualities in some contexts they ultimately failed Skilling in his work with Enron? (Why? What does Bethany McLean mean by characterizing Enron and Skilling's role in the events that unfolded, as a tragedy? How does this compare with Greek tragedies like Oedipus and Antigone?)
5. Enron develops "creative" accounting methods. Mark-to-market allows them to declare future earnings expected from a project at the moment

the deal is made. While good in the short term, this method quickly put Enron on an accelerating treadmill: to maintain the illusion of profitability they had to keep making deals and declaring up front expected profits. Enron also used Special Purpose Entities to distribute risk and secure needed loans at low interest rates. SPEs were artificial corporations endowed with Enron assets like gas pipelines and energy contracts. These assets made it possible for Enron to get low interest loans and generate need cash flow. The problem was that Enron used its stock to guarantee the loans given to the SPEs. Thus, Enron had to continually make deals to appear profitable to keep its stock value rising, and we're back to the accelerating treadmill.

6. Enron took on the identity of an "idea" company. They saw themselves as a laboratory where ideas were generated by creative and brilliant people and then realized in the real world through deals made by deal-makers like Cliff Baxter and Rebecca Mark (who made the Dahbol power plant deal). Examples of ideas include Enron Broadband, the Dahbol, India Power Plant, and energy futures.

7. It is now common knowledge that the California energy crises (which led to the recall of governor Gray Davis and the election of Arnold Schwarzenegger) was created by Enron traders. (The book and documentary, "The Smartest Guys in the Room," provides a convincing case for this including scary conversations between Enron traders that were tape recorded and later replayed before Congressional Committees.) Matters were worsened when Jeffry Skilling compared California to the sinking ship, Titanic; they were the same (both disasters), except for the fact that the Titanic's lights were still on when it went down. (His punishment: a pie in the face thrown by an angry California energy consumer.)

8. While Enron's rise took place gradually over fifteen years, its fall was spectacular and rapid. This lends credence to the claim that Enron was a house of cards, more appearance than solid reality.

Enron Cautionary Tales

- Enron Broadband (as well as the Dot.Com corporations that failed at around the same time): Promising technological projects turn out bad when the values embedded in the technology conflicts with those

embedded in the surround socio-technical system. (See the module on socio-technical systems for more information.)

- Why did Dahbol work? (Dahbol, the failed India power plant, is the second cautionary tale.) Local opposition, misfit of technology with surround STS, and poorly thought-out transfer of technology all contributed. A commentator in the documentary remarked how India is a bad place to build good technology. But another case detailed in the article, "People's Science in Action," shows how another energy projected succeeded through a participatory design strategy. Those in Puerto Rico may reflect on whether there are lessons to be learned both from the failed Dahbol plant and the successful Uchangi dam in the Maharashtra state. (Witness current opposition to building a windmill farm in Guanica.)
- Are financial and accounting tools like mark-to-market, financial risk distribution tools, (collateralized debt obligations and credit default swaps), and SPEs inherently bad or harmful? Can we treat financial and accounting tools as technologies? (Not value-neutral, fit or don't fit with underlying STS, exhibit a trajectory...).
- These cautionary tales show how Enron issues overlap with research ethics and ethics of technology issues.

Materials and profiles on Enron are based on McLean and Elkind, **The Smartest Guys in the Room**. Complete reference below. Malcolm Gladwell's **New Yorker** article on Enron (see complete reference below) provides a full discussion of the relevance of the distinction between puzzle and mystery to this and other cases.

Baltimore Case

The Baltimore Case: A Rasamon Approach

- **When Margot O'Toole was unable to duplicate research scientist Thereza Imanishi-Kari's observations, she first supposed that it was due to her lack of expertise. But repeated failures (and brusque treatment by Imanishi-Kari) led her to think otherwise. O'Toole blew the whistle on Imanishi-Kari and on the project**

leader, David Baltimore (a Nobel prize winner) leading to an NIH investigation and a Congressional hearing led by Representative John Dingell. Initially found guilty of fabrication by the National Institute for Health, Imanishi-Kari was cleared of all charges of fraud in the form of fabrication in 1996.

- You are **David Baltimore**, a Nobel Prize winner in biology in 1975 for groundbreaking work in virology. Now your interests have turned to immunology. The study of the production of antibodies (substances in the body which defend against disease) in mice have led you to partner with promising young researcher Theresa Imanishi-Kari, an expert in serology. Together with David Weaver and Imanishi-Kari, you have co-authored a paper published in the well-known journal, **Cell**. Now Imanishi-Kari stands accused by one of heer post-doctorates of fabricating some of the data used in this article. You stand by her research; she may have been sloppy in some of the documentation but her work has always been solid in the past. Outline and defend your intention to stand by Imanishi-Kari and the conclusisons you, her, and Weaver have published in **Cell**. How do you respond to those who accuse you of bullying O'Toole?

- Your name is **Margot O'Toole**. You are a post-doc researcher in biology and have been working in a laboratory supervised by Teresa Imanishi-Kari. Recently you and Imanishi-Kari have become more and more estranged. First, she makes unrealistic demands of you in terms of devotion to research. You are a mother and a wife and don't want to sacrifice these responsibilities to your academic career. You also have a Ph.D. in biology with good recommendations from past teachers and mentors, you are unable to duplicate Imanishi-Kari's experimental results. Because she grew up in Brazil and her family is Japanese, English is her third language; at times you find it difficult to understand her and follow her directions. She is also blunt to a fault. She has told you that you don't have the skills to make it as a researcher. You disagree. The problem is not with your research skills but with Imanishi-Kari's sloppy methods and documentation. Furthermore, you suspect her of having fabricated some of her data, especially when you see discrepancies between the data you found in her notebooks and the data she reports in the Cell article. Taking these concerns to Imanishi-Kari is out of the question given your recent

estrangement. But other team members, including Baltimore, have also proven unreceptive to your concerns. In fact, MIT's investigation has been nothing if not perfunctory. Should you blow the whistle? To whom? Outline your concerns, develop a course of action, and justify it. How do you respond to those who have labeled you as a trouble-maker on the basis of their interpretation of your past work and studies?

- Your name is **Theresa Imanishi-Kari**. You are a promising young researcher born in Brazil of Japanese parents. English is your third language; sometimes those who work under you have trouble understanding your instructions and even your supervisor and mentor, David Baltimore, has to take pains to make sure he has successfully communicated with you. You have been asked by Baltimore, a Nobel Prize winning biologist, to work with him on a study into how the immune system produces antibodies. Your specialty is serology. Your work is difficult, painstaking, requires extensive documentation, but years of hard work have begun to pay off with interesting--even surprising--results. Now you find out that one of the post-doctorates under your supervision has accused you of fabricating data. MIT, your home institution, has just completed an internal investigation and has found nothing improper. But the NIH has begun a much more intensive investigation where they have asked you for your laboratory notebooks and have begun to question you on discrepancies between what you have recorded there and what you report in the Cell article. While Baltimore has stood by you so far, he is under increasing pressure to denounce you and your research. The situation with O'Toole, the Post-Doc accusing you, is incomprehensible. She understands the basic concepts of your research but lacks the practical skills required by a good researcher. She has been unable to duplicate your results because she lacks the necessary skills; her accusations arise out of her refusal to acknowledge her own limitations. You have made her aware of this, bluntly to be sure, but you believe it is better to be open and direct with people. Now you have to defend your actions in the context of an increasingly politicized investigation. Outline your position. Defend your research against the accusations of O'Toole and the NIH. Discuss the demands of research documentation, the

complexity of your experiments, and the need for science (and scientists) to function without undue public and government scrutiny.

- You are **John Dingell**, Congressman from the state of Michigan. You see yourself as a crusader, a defender of the little-guy, and upholder of justice in the face of corrupted and powerful vested interests. The community of practicing scientists is your next target. Scientists compete ruthlessly for millions of tax dollars to set up their labs and carry out their research. They have a responsibility for conducting their research and upholding the pubic trust while maintaining the highest standards. Now you have become aware of a specific case of scientific fraud, a case of fabrication of data to maintain a well-funded scientific project. A brave young woman, Margot O'Toole, has tried to bring this problem to the attention to the faculty at MIT but they have closed ranks. In the center of this case is Nobel Prize winner, David Baltimore, who, when brought news of fraud committed by a researcher under his supervision, responded by shooting the messenger (O'Toole) instead of responding to the message. You are holding hearings into O'Toole's accusations. You are determined to use the power of Congress to stand up to the cronyism rampant within the scientific community.

Rashamon-Type Cases

- **Rashamon** is a Japanese movie about a killing and a sexual encounter. These events are inserted into three different narratives by the three different participants. The killing may be a murder or a suicide, depending on the story-teller. The sexual encounter may be a tryst or a rape, depending, again, on the narrative point of view.
- In this assignment, the class will recreate the Baltimore case from the standpoint of the different perspectives of the case's participants. Margaret O'Toole is the heroine-whistle-blower, false accuser, incompetent researcher, or trouble maker depending on who is telling the story. David Baltimore is a Nobel Prize winning biologist who is either exemplary of scientific virtue or an arrogant insider. John Dingell is a Congressional representative holding hearings into scientific integrity; he is either a McCarthy-type figure engaged in a witch hunt or a genuine crusader placing the public spotlight on an

internally corrupt scientific community. Theresa Imanishi-Kari is either a ruthless investigator playing the publish or perish game or the innocent victim of the accusations of a disgruntled former subordinate.
- Your job is to argue sympathetically from within each of these participant perspective. Then as a class, we will see if we can construct an overarching narrative or story that reconciles these conflicting perspectives.

Kelves provides the most comprehensive reporting on this case. Sismondo and Whitbeck provide shorter sketches. These exercises are built out of materials from each and where there are conflicts the author has given priority to Kelves's comprehensive study. Readers should consult all three to get an idea of the range of different views.

The notion of a Rashamon case comes from looking at the Swift case delivered by the research ethics team from Oklahoma State University and from the reflections on this issue by Patricia Werhane in her book, **Moral Imagination and Management Decision-Making** (1999), Oxford University Press.

The Belmont Report

- The **Belmont Report** was written, in part, in response to the abuse of those involved in the Tuskegee study. It identifies three fundamental ethical principles, respect for persons, beneficence, and justice.
- The report then uses these principles as a framework for making sense of concerns that arise in experiments involving human experiments: the informed consent of those participating in the experiment, assessing the risks and benefits associated with a given experiment, and outlining the ethical issues involved in selecting subjects to participate in experiments.
- The Belmont Report was also influence in setting up and structuring what have come to be known as Institutional Review Boards or IRBs. More information on IRBs can be found by reading Van Kloempken's short piece (accessed through the Open Seminar link above) and the

Office of Research Integrity's "Introduction to the Responsible Conduct of Research" especially pages 35-47.
- In this section, you will view a quick summary of the report's principles and research ethics concerns. Then you will apply these concepts by role-playing as a member of an IRB hearing a research proposal.

Principles

- **Respect for Persons**: "Individuals should be treated as autonomous agents." "Persons with diminished autonomy are entitled to protection." the Intro to RCR characterizes respect for persons as "their right to make decisions for and about themselves without undue influence or coercion from someone else (the researcher in most cases).
- **Beneficence**: "[D]o not harm" and "maximize possible benefits and minimize possible harms."
- **Justice**: "Who ought to receive the benefits of reseach and bear its burdens?" The introduction to RCR characterizes it as "the obligation to distribute benefits and risks equally without prejudice to particular individuals or groups, such as the mentally disadvantaged or members of a particular race or gender." This concentrates primarily on distributive justice and what Nozick calls the patterns of distribution include equal shares, need, effort, societal controls, and merit.

Applications in Research

- **Informed Consent**: **"Respect for persons requires that subjects, to the degree that they are capable, be given the opportunity to choose what shall or shall not happen to them. This opportunity is provided when adequate standards for informed consent are satisfied."** This is unpacked in terms of information (receiving information pertinent to consenting to participate), comprehension (understanding and appreciating the information communicated), and voluntariness (which excludes participation obrained through coercion or compulsion.)
- **Assessment of the risks and benefits**: "The assessment of risks and benefits requires a careful arrayal of relevant data, including, in some

cases, alternative ways of obtaining the benefits sought in the research. Thus, the assessment presents both an opportunity and a responsibility to gather systematic and comprehensive information about proposed research. For the investigator, it is a means to examine whether the proposed research is properly designed. For a review committee, it is a method for determining whether the risks that will be presented to subjects are justified. For prospective subjects, the assessment will assist the determination whether or not to participate." Sub-issues concern the nature and scope of consequences considered and what the report terms "systematic assessment." Other issues included under assessment of risks and benefits: brutal and inhumane consequences, necessary risk, serious impairment, vulnerable populations and documentation of informed consent procedures.

- **Selection of Subjects**: This touches most on the principle of justice. **"Just as the principle of respect for persons finds expression in the requirements for consent, and the principle of beneficence in risk/benefit assessment, the principle of justice gives rise to moral requirements that there be fair procedures and outcomes in the selection of research subjects."**

What you are going to do

Exercise 1: Take Research Ethics Pre-Test

1. Click on the Media File above to take the Research Ethics Pre-Test
2. This exercise is not a formal test. Instead, it is designed to help you begin to recognize how ethical issues permeate research. Of special importance are the cases in this exercise that look at research as it is constrained by the business environment. Ask yourself two questions. First, does competition distort or deflect research? How? Second, does money (and operating under market-driven conditions) distort or deflect research? How?
3. There are three ethics tests that are frequently taught in corporate ethics training programs: reversibility, harm, and publicity. Check out m13757 (Three Frameworks for Ethical Decision-Making and Good

Computing Reports) for more information on the tests. Or look up the description given of these tests at Computingcases.org. Does the use of these tests limit the range of disagreement you have with your classmates on these issues? Why or why not?

Exercise 2: Enron--A Puzzle or Mystery?

- Reread the summary of Malcolm Gladwell's distinction between a mystery and a puzzle.
- Was Enron a puzzle? Explain your answer. Was Enron a mystery? Explain why or why not.
- If Enron is a puzzle, then who do we blame? What do we blame them for? (How does moral responsibility function under a puzzle versus a mystery?)
- Pretend you are Jeffry Skilling, and you are testifying before the U.S. Congress on your role in the Enron disaster. How would you try to present Enron? As a puzzle or mystery? In other words, which framing of the case does the most to mitigate your blame?
- Now, think about this further question. Enron financial tools such as energy futures, mark-to-market accounting, and Special Purpose Entities function differently in the context of a puzzle than in the context of a mystery. Were these tools (say mark-to-market accounting) used to cover up crucial information and prevent experts and the public from solving the Enron puzzle?
- Or were these tools elements in a mystery where, properly interpreted by financial experts, could lead to the telling of the story of Enron's collapse.
- To re-frame the question slightly, are financial tools like mark-to-market accounting, energy futures, and SPEs value-neutral in that they become good or bad only the context of the use to which we put them? Or are these tools, themselves, value-laden so that they channel us in certain directions to realize some values and not realize others?
- Try thinking of financial tools as technologies. (John Dewey starts this process by thinking of operations of logic as tools for conducting inquiry. See Hickman's book cited below.)

Exercise 3: Baltimore Case Role-Play

- **Rashamon** is a Japanese movie about a killing and a sexual encounter. These events are inserted into three different narratives by the three different participants. The killing may be a murder or a suicide, depending on the story-teller. The sexual encounter may be a tryst or a rape, depending, again, on the narrative point of view.
- In this assignment, the class will recreate the Baltimore case from the standpoint of the different perspectives of the case's participants. Margaret O'Toole is the heroine-whistle-blower, false accuser, incompetent researcher, or trouble maker depending on who is telling the story. David Baltimore is a Nobel Prize winning biologist who is either exemplary of scientific virtue or an arrogant insider. John Dingell is a Congressional representative holding hearings into scientific integrity; he is either a McCarthy-type figure engaged in a witch hunt or a genuine crusader placing the public spotlight on an internally corrupt scientific community. Theresa Imanishi-Kari is either a ruthless investigator playing the publish or perish game or the innocent victim of the accusations of a disgruntled former subordinate.
- Your job is to argue sympathetically from within each of these participant perspective. Then as a class, we will see if we can construct an overarching narrative or story that reconciles these conflicting perspectives.

Exercise 4: Milgram Role-Play

- You are different members of the Institutional Review Board of a prominent east-coast U.S. university. Your job is to evaluate the research proposal presented by your instructor who is role-playing as famous social psychologist, Stanley Milgram.
- Read Kloempkin's short article on IRBs. You can access it by the URL provided in the second reference section. Study, also, the principles and applications set forth in the Belmont Report as summarized above. (You can also access the report which is fairly short through the URL provided below.)

- Then read Milgram's research proposal (actually a pretend proposal since the original experiment did not go through an IRB.) Evaluate this proposal using the Belmont criteria as well as the IRB criteria outlined by Kloempkin.
- You will look at videos made of some of the actual subjects of the Milgram experiments. View these and assess the actual impacts of the experience for them.
- Milgram (your teacher role-playing) will make a new proposal before you as an IRB member for a second phase of his experiment. Given what you have learned about the actual results of the experiment and what you have seen from the videos made of the experiments and using the Belmont principles and IRB criteria, should you allow Milgram to continue with his experiments.

What did you learn?

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Presentations for Graduate Awareness Workshop

Below are two presentations upon which different variations of the Graduate Awareness Workshop will be built. They both explore basic and intermediate moral concepts such as rights, duties, plagiarism, and integrity. They also contain material and exercises designed to help capstone design courses in engineering and science effectively integrate ethical issues. In addition to the presentations, the last media file contains a document that provides the Pre-Test, Post-Test, and GAW evaluation forms in Word format.

Presentation: Integridad Academica y Etica de la Investigacion by Luis Jimenez, Efrain O'Neill, and Eddie Marrero
https://cnx.org/content/m31972/

This Spanish presentation provides a general introduction to academic integrity and research ethics. It has been tested with graduate students in a Graduate Awareness Workshop various times in the spring and summer of 2007 in connection with NSF grant 0629377, Graduate Education in Research Ethics for Scientists and Engineers.

Presentation: La actividad academica como empresa moral by Jorge Ferrer and Efrain O'Neill
https://cnx.org/content/m31972/

This presentation developed for incoming graduate students is

designed to develop a preliminary basis of ethical awareness upon which moral deliberation and case analysis skills will be built. Written in Spanish, this presentation was developed by Dr. Jorge Ferrer and Dr. Efrain O'Neill

September 29 2007 Presentation
https://cnx.org/content/m31972/

This figure contains the Power Point presentation given for the GAW on September 29, 2007. To date it is the most recent version of the workshop.

Graduate Awareness Workshop Pre and Post Test Exercises
https://cnx.org/content/m31972/

This presentation, developed by Efrain O'Neill and Luis Jimenez, has been used to introduce research ethics to incoming graduate students in Electrical Engineering. Eddie Marrero and Jorge Ferrer also contributed material.

Issue Identification Workshop Presentation
https://cnx.org/content/m31972/

Clicking on this figure will
open the powerpoint
presentation used in a
faculty issue identification
activity held at the
University of Puerto Rico
at Mayaguez on
November 29, 2007.

Socio-Technical Systems in Professional Decision Making
This module has been revised to fit better within courses and modules in business education. It presents socio-technical analysis as a method for integrating ethical and social values into business practice. Socio-technical system analysis facilitates understanding the ethical and social impacts aspects of business but more fundamentally it helps to anticipate potential problems early on in the business process where they can be dealt with more effectively. This module includes different ways of setting up a STS analysis, provides case studies to make STS analysis concrete and realistic, and relates STS analysis to the dimensions of moral imagination and moral creativity which are so essential for effective problem-solving. Two socio-technical system tables are attached that serve as templates for decision making exercises as well as business product and process analyses. One table outlines the general components of the socio-technical system underlying the practice of engineering in Puerto Rico. Another, prepared by William Frey, Efrain O'Neill, Alberto Ramirez, and Agustine Irizarry, describes the socio-technical system underlying power systems engineering in Puerto Rico. A final table turns STS analysis more toward the business process by looking at the different components of the STS of a fictional corporation named "Burger Man." (This exercise was developed and taught by Paul Thompson in agricultural ethics classes and made available to the author during an Ag-Sat sponsored, multi-university course in agricultural ethics offered by Thompson in 1992.) Socio-technical analysis provides an excellent pedagogical response to various accreditation requirements including ABET (Accreditation Board of Engineering and Technology) and AACSB (American Association of Collegiate Schools of Business).This module is being developed as a part of an NSF-funded project, "Collaborative Development of Ethics Across the Curriculum Resources and Sharing of Best Practices," NSF SES 0551779.

Module Introduction

Milagro Beanfield War
Joe Mondragon has created quite a stir in Milagro, a small village in New Mexico. He has illegally diverted water from the irrigation ditch to his field to grow beans. Access to scarce water in New Mexico has created sharp political and social disputes which have reached a crises point in Milagro. Competing with traditional subsistence farmers like Joe is the profitable recreation industry. Ladd Devine, a wealthy developer, has joined with the state government in New Mexico to build a large recreational center consisting of a restaurant, travel lodge, individual cabins and a lavish golf course. Since there is not enough water to cover both recreational and agricultural uses and since Ladd Devine's project promises large tax revenues and new jobs, the state government has fallen behind him and has promised to give to the recreational facilities all the water it needs. Hence, the problem created by Mondragon's illegal act. You work for Ladd Devine. He has asked you to look into local opposition to the recreational facility. Along these lines, you attend the town meeting scheduled by Ruby Archuleta in the town's church. You are concerned about Charlie Bloom's presentation and the impact it may have on the local community. Prepare a STS analysis to test Bloom's assertions and better prepare Ladd Devine for local opposition to his facility.

Incident at Morales
Fred is a chemical engineer hired by Phaust Corporation to design and make operational a new chemical plant for the manufacture of their newly redesigned paint thinner. Under financial pressure from the parent French company, Chemistre, they have decided to locate their new plant in Morales, Mexico to take advantage of lower costs and more flexible government regulations. You are well on the way toward designing this new plant when news comes from Chemistre that all budgets are being cut 20% to finance Chemistre's latest takeover acquisition. You are Fred and are now faced with a series of difficult financial-engineering decisions. Should you hold out for the more expensive Lutz and Lutz controls or use the cheaper ones produced locally? Should you continue with the current plant size or cut plant size and capacity to keep within budgetary constraints? You have also been made aware of the environmental and health risks associated with not lining the waste ponds used by the plant. Do you advocate lining the ponds or not, the latter being within compliance for Mexican environmental and health regulations. Prepare a STS analysis to help you make and justify these decisions. Make a series of recommendations to your supervisors based on this study.

Puerto Rican Projects

- Your company, Cogentrix, proposes a cogeneration plant that uses coal, produces electricity, and creates steam as a by-product of electricity generation process. Because the steam can be sold to nearby tuna canning plants, your company wishes to study the feasibility of locating its plant in or near Mayaguez, Puerto Rico.

(Co-generation technology has become very popular and useful in some places.) Carry out a STS analysis to identify potential problems. Make a recommendation to your company. If your recommendation is positive, discuss how the plant should be modified to fit into the Mayaguez, Puerto Rico STS.

- Your company, Southern Gold Resources, is interested in mining different regions in central Puerto Rico for copper and gold. But you know that twenty years earlier, two proposals by two international mining companies were turned down by the PR government. Carry out a STS study to examine the feasibility of designing a different project that may be more acceptable to local groups. What does your STS analysis tell you about social and ethical impacts, financial promise, and likely local opposition. Can profitable mining operations be developed that respect the concerns of opposed groups? What is your recommendation based on your STS analysis?

- Windmar, a company that manufactures and operates windmills for electricity generation has proposed to locate a windmill farm in a location adjacent to the Bosque Seco de Guanica. They have encountered considerable local opposition. Carry out a STS analysis to understand and clarify this opposition. Can the concerns of local stakeholders be addressed and the windmill farm still remain profitable? How should the windmill project be modified to improve its chances of implementation?

Things to Know about STSs

What is a Socio-Technical System? (STS)
A socio-technical system (=STS) is a tool to help a business anticipate and successfully resolve interdisciplinary business problems. "Interdisciplinary business problems" refer to problems where financial values are intertwined with technical, ethical, social, political, and cultural values. (Reference: Chuck Huff, Good Computing: A Virtue Approach to Computer Ethics, draft manuscript for Jones and Bartlett Publishers)
Some Things to Know About STSs

1. Socio-Technical systems provide a tool to uncover the different environments in which business activity takes place and to articulate how these constrain and enable different business practices.
2. A STS can be divided into different components such as hardware software, physical surroundings, people/groups/roles, procedures, laws/statutes/regulations, and information systems. Other components include the natural environment, markets, and political systems.
3. But while different components can be distinguished, these are, in the final analysis, inseparable. Socio-Technical Systems are first and foremost **systems**: their components are interrelated and interact so that a change in one often produces changes that reverberate through the system.
4. Socio-Technical systems embody moral values such as justice, responsibility, respect, trust, and integrity as well as non-moral values such as efficiency, satisfaction, productivity, effectiveness, and profitability. Often these values can be located in one or more of the system components. Often they conflict with one another causing the system as a whole to change.
5. STSs change, and this change traces out a path or trajectory. The normative challenge here is to bring about and direct changes that place the STS on a value-positive trajectory. In the final analysis, we study STS to make sure that they change in a value-realizing direction.

Constituents or Sub-Environments of Business Activity

Paragraph summary of sub-environments of business followed by a table devoted to each one.

- **Technology** including hardware, software, designs, prototypes, products, or services. Examples of engineering projects in Puerto Rico are provided in the PR STS grid. In the Therac-25 case, the hardware is the double pass accelerator, in Hughes the analogue-to-digital integrated circuits, and in Machado the UNIX software system and the computers in the UCI laboratories that are configured by this system. Because technologies are structured to carry out the intentions of their designers, they embed values.
- **Physical Surroundings**. Physical surroundings can also embed values. Doors, by their weight, strength, material, size, and attachments (such as locks) can promote values such as security. Physical surroundings promote, maintain, or diminish other values in that they can permit or deny access, facilitate or hinder speech, promote privacy or transparency, isolate or disseminate property, and promote equality or privilege.

- **People, Groups, and Roles**. This component of a STS has been the focus of traditional stakeholder analyses. A stakeholder is any group or individual which has an essential or vital interest in the situation at hand. Any decision made or design implemented can enhance, maintain, or diminish this interest or stake. So if we consider Frank Saia a decision-maker in the Hughes case, then the Hughes corporation, the U.S. Air Force, the Hughes sub-group that runs environmental tests on integrated circuits, and Hughes customers would all be considered stakeholders.
- **Procedures**. How does a company deal with dissenting professional opinions manifested by employees? What kind of due process procedures are in place in your university for contesting what you consider to be unfair grades? How do researchers go about getting the informed consent of those who will be the subjects of their experiments? Procedures set forth ends which embody values and legitimize means which also embody values.
- **Laws, statutes, and regulations** all form essential parts of STSs. This would include engineering codes as well as the state or professional organizations charged with developing and enforcing them
- The final category can be formulated in a variety of ways depending on the specific context. Computing systems gather, store, and disseminate information. Hence, this could be labeled **data and data storage structure**. (Consider using data mining software to collect information and encrypted and isolated files for storing it securely.) In engineering, this might include the information generated as a device is implemented, operates, and is decommissioned. This information, if fed back into refining the technology or improving the design of next generation prototypes, could lead to uncovering and preventing potential accidents. Electrical engineers have elected to rename this category, in the context of power systems, rates and rate structures.

Component	Description	Examples	Frameworks	More Frameworks
Technological	Hardware: Machines of different kinds	Door (with tasks delegated to it such as automatically shutting and being locked)	Value Discovery (identifying and locating values in STS)	**Social Constructionism>**: Restoring interpretive flexibility to reconstruct a technology to remove bias and realize value
	Code that configures machines around human purposes	Power generating technologies based on renewable and nonrenewable resources	Value Translation (Operationalizing and implementing values in a STS by designing and carrying out a procedure)	Identifying and mitigating complexity in the form of tightly-coupled systems and non-linear causal chains
	Technology can constrain business activity by de-skilling	Automobiles, computers, cell phones all of which have produced profound changes in our STSs	Value Verification (Using methods of participatory observation to determine how effectively values have been realized.)	De-centralizing control and authority
	Technology, especially software, can	Microsoft Office, Firefox Browser, Google	**Transperspectivity**: discovering strands of construction of current STS;	Designing to avoid the technological imperative and reverse adaptation (where

| | | instrument human action | Chrome, Google Docs, Social Networking software | identifying possibilities for reconstruction | humans abandon ends and serve the ends of technologies |

Technological ComponentTechnological component of STS

Component	Description	Examples	Frameworks	More Frameworks
Ethical Environment	**Moral Constructs**: Spheres of justice where distribution takes place according to context-dependent rules (Rules)	**Basic Moral Concepts**: rights, duties, goods, values, virtues, responsibility, and justice	**Utilitarianism**: Happiness is tied to maximizing the satisfaction of aggregated preferences.	**Basic Capabilities**: life, bodily health, bodily integrity
	Social Constructs: Power and its distribution among groups and individuals	**Intermediate Moral Concepts**: Privacy, Property, Informed Consent, Free Speech, due Process, Safety/Risk	**Rights**: Capacities of action that are essential to autonomy, vulnerable to standard threats, and correlated with feasible duties	**Cognitive Capabilities**: Sense, Imagination, Thought; Emotion; Practical Reason
	Right: A right is a capacity of action, essential to autonomy, that others are obliged to recognize and respect.	**Privacy**: If the information is directly relevant to the relation to the holder and the seeker, then it is not private.	**Virtues**: Settled dispositions toward choosing the mean between extremes of excess and defect. (Courage is the mean between cowardice and recklessness)	**Social Capabilities**: Affiliations, Other Species
	Duty: A duty is a principle that obliges us to recognize and respect the	**Property**: That with which I mix my labor is mine. Intellectual property is	**Capabilities Approach**: For Nussbaum, capabilities answer the question, "What is this person able to do or be?" For Sen, capabilities are "'substantial freedoms,' a set of (causally	**Capabilities that address vulnerabilities**: Play and Control over one's environment

	rights of others.	non-rivalrous and non-excludable.	interrelated) opportunities to choose and act."	

Table 2: Ethical and Social ComponentEthical Environments of the socio-technical system

Physical Surroundings	Description	Examples	Frameworks	Frameworks
	Physical environment imposes constraints (limits) over actions that restrict possibilities and shape implementation.	Influence of rivers, mountains, and valleys on social and economic activities such as travel, trade, economic and agricultural activity, commerce, industry, and manufacturing.	Classroom environment enables or constrains different teaching and learning styles. For example, one can pair off technically enhanced and technically challenged classrooms with student-centered and teacher-centered pedagogical styles and come up with four different learning environments. Each constrains and enables a different set of activities.	The physical arrangement of objects in the classroom as well as the borders created by walls, doors, and cubicles can steer a class toward teacher-centered or student-centered pedagogical styles.

Physical Surroundings This table summarizes the physical environment of the STS and how it can constrain or enable action.

Stakeholders	Description	Examples	Frameworks	Frameworks
	Any group or individual that has a vital interest at play (at stake) in the STS.	**Market Stakeholders**: Employees, Stockholders	**Non-Market Stakeholders**: communities, activist groups and NGOs	**Role**: The place or station a stakeholder occupies in a given organizational system and the associated tasks or responsibilities.
		customers, suppliers retailers/wholesalers,	business support groups, governments,	**Interests**: Goods, values,

		creditors	general public (those impacted by projects who do not participate directly in their development	rights, interests, and preferences at play in the situation which the stakeholder will act to protect or promote.
		(Distinction between market and non-market stakeholders comes from Lawrence and Weber, **Business and Society: Stakeholders, Ethics, Public Policy**, 12th edition. McGraw-Hill, 14-15.	Alliances are discussed by Patricia Werhane et al., **Alleviating Poverty Through Profitable Partnerships: Globalization, Markets, and Economic Well-being**. Routledge (2009).	**Relation**: Each stakeholder is related to other stakeholders in an alliance and each relation is tied to goods and values.

People, Groups, and Roles (Stakeholders)This table shows the social or stakeholder environment of the STS. A stakeholder is any group or individual that has a vital interest at play in the STS.

Procedural	Description	Examples	Framework	Framework
	A series of interrelated actions carried out in a particular sequence to bring about a desired result, such as the realization of a value. Procedures can schematize value by setting out a script for its realization.	Hiring a new employee: (a) settling on and publishing a job description; (b) soliciting and reviewing applications from candidates; (c) reducing candidate list and interviewing finalists; (d) selecting a candidate; (e) tendering that candidate a job offer.Other procedures: forming a corporation, filing for bankruptcy, gaining consent to transfer TGI and PII to a third party (Toysmart: opt-in and opt-out procedures).	**Value Realization Process** in Software Engineering: (a) **Discovery**: Uncovering values shared by a given community; (b) **Translation**: operationalizing and implementing values in a given STS; (c) **Verification**: using methods of participatory observation (surveys and interviews) to validate that the values in question have been discovered and translated.	**Challenging the Statement of Values**: (a) A stakeholder group raises a conceptual, translation, range, or development issue; (b) Group presents their challenge and response to other stakeholders; (c) If other stakeholder groups agree, then the challenge leads to a revision in the SOV; (d) Community as a whole approves the revision.

Procedural Environment

Laws, Statutes, Regulations	Description	Examples	Frameworks	Frameworks
	Laws differ from ethical principles and concepts in that laws prescribe the minimally moral while ethical principles and concepts routinely explore higher moral "spaces."	**Criminal Law**: Applies to individuals; interested party in a criminal trial is society, not the victim.	**Civil Law**: Torts concern wrongful injury. The objective of a tort is to make the victim "while" after an injury.	US and British law work through a common law system where current decisions are based on past decisions or precedent.
	Ethical principles challenge and criticize laws by bringing into question their normative content.	Involves proving a **mens rea** (guilty mind) and **actus reus** (guilty or law-breaking act) and that the mens rea caused the actus reus.	To prevail in a tort one ust prove (in order of severity) negligence, recklessness, or intent.	The Puerto Rican system of law is based on the Napoleonic code where decisions relate directly to existing law and statute and precedent plays a weaker role.
	Laws can challenge ethical principles and concepts by raising issues of practicality. Also, as in responsibility theory, the law can structure and inform the moral discussion.	Criminal law does not apply to corporations because they "have no soul to damn and no body to kick" Baron Thurlow	Negligence involves proving that the defendant failed to meet some standard of **due care**.	Question: How does the statute-based Napoleonic system in PR constrain and enable business practice in relation to other systems such as the British and American common law systems?
			Contract law concerns the violation of the terms of a contract.	

Legal Environment: Laws, Statutes, Regulations

Market Environment	Description	Examples	Frameworks	Frameworks
	Business takes place within different markets that shape supply, demand, and price. Globalization frequently requires that a business be adept at operating across different markets	**Laissez Faire**: Each economic unit makes choice based on rational (enlightened) self-interest. (Private ownership of goods.)	**Assumptions of a Free Market System**: (a) Individual decisions are aggregated. (b) Information flows through price structure.	**Recent economic studies of the limits of laissez faire markets**:
	Liberal use made here of notes from Economics class taught by CR Winegardner, University of Toledo, 1971-1972	**Liberal Democratic Socialism**: Limited government intervention is needed to improve upon the choice of individual economic units. (Mixture of private and public ownership)	(c) Free association. (d) Absence of force or fraud. (e) Individual agents are rational utility maximizer	(a) **Information Asymmetries** (as studied by Stiegliz). (b) **Monopolies** which, in the absence of competition, can dictate standards of price, product and service.
	Materials also take from Natural Capitalism from Lovins and Hawkings.	**Communist, Authoritarian Socialism**: The state is in the best position to know what choices and policies are beneficial for the economy as a whole and its component parts. (Public ownership of goods and services)	(f) Governments should adopt a hands-off stance because interference disrupts the ability of markets to produce utility-maximizing conditions. (4,4)	Animal spirits deflect economic decision-making away from perfect utility maximizing. They include confidence, fairness, corruption, money illusion, and stories.(4,5)
(5,1)	(5,2)	(5,3)	(5,4)	Ghoshal: bad management theories are destroying good mangement practices as they become self-

				fulfilling prophecies. Ghoshal is especially critical of agency theory, compliance/punitive approaches to corporate governance, and the theory of human nature he calls "Homo Economicus."(5,5)

Market Environment

Information Environment(1,1)	Description(1,2)	Examples(1,3)	Frameworks(1,4)	Frameworks(1,5)
(2,1)	How data and informaiton is collected, stored, and transmitted along with ethical issues such as informed consent and privacy that accompany information management (2,2)	**Informed Consent**: Obtaining consent from information holder when collecting, storing, and transferring personal identifying information or transaction generated information. (2,3)	**Privacy in Context** (2,4)	**Data Transfer and Informed Consent**(2,5)
(3,1)	(3,2)	**Belmont Report**: (a) Principles: Respect for persons, beneficence, and justice; (b) Application 1: Informed consent as "subjects to the degree that they are capable be given the opportunity to choose what shall or shall not happen to them;" (c)	(a) Identify individuals in groups in a context; (b) Identify the roles played by these individuals and groups.(3,4)	**Opt-in**: Information is not transferred unless data-holder expressly consents; **Opt-out**: Data will be transferred unless holder expressly refuses or withdraws consent.(3,5)

		Application 2: assessment of risks and benefits; (d) Application 3: Selection of subjects for experiment. (3,3)		
(4,1)	(4,2)	**Conditions of Informed Consent** Information, Comprehension, Voluntariness. (4,3)	(c) Identify context-relative norms that guide activities within context and between one context and another. (Materials on privacy in context are taken from Helen Nissembaum in her book, **Privacy in Context**(4,4)	**Fair Information Practices**: (a) Notice: full disclusure and redress (way to resolve problems); (b) Choice: Choice about how informaitn is to be used; (c) Access: access to stored and about to be disclosed information; (d) Security: ways that information will be kept secure and unauthorized access prevented incollection, storage, and transfer of information.(4,5)

Information Environment: Collecting, Storing, and Transferring Information

Natural Environment(1,1)	**Description**(1,2)	**Examples**(1,3)	**Frameworks**(1,4)	**Frameworks**(1,5)
(2,1)	**Wicked Problems**(2,2)	**Principles of Systainability according to B. Norton**(2,3)	**Four Theoretical Approaches to Environmental Ethics**(2,4)	**Environmental Value as determined by shadow markets**(2,5)
(3,1)	(a) Difficulties in formulating and structuring problem; (b)	**Precautionary Principle**: "in situations of high risk and high	(a) **Extensionism**: Peter Singer's extension of Utilitarianism to	**Willingness-to-pay**: Resource in question would go to the highest

	Non-compatibility of solutions (several ways of stating solutions).(3,2)	uncertainty,always choose the lowest risk option." (Cass Sunstein distinguishes several senses of the PP including one which makes it impossible to deviate from the status quo) (Norton 348)(3,3)	cover sentient beings; (b) Tom Regan's ascription of rights to select animals. **Biocentrism**: Taylor's attribution of moral consideration to all teleological centers of a life. (3,4)	bidder, that is, value is dependent on most intense preference and the disposable income to assert that preference(3,5)
(4,1)	(c) Wicked problems are "non-repeatable" in that they are context-dependent. This renders learning from previous problems and solutions much more difficult; (d) Wicked problems involve "competing values" that cannot be realized at the same time and that cannot be homogenized or plotted on a single scale; (e) Wicked problems exhibit "open-ended inter-temporal effects". **Closely paraphrased from Norton, Systainability, 133-5**(4,2)	**Safe Minimum Standard**: "save the resource, provided the costs of doing so are bearable" (Norton 346)(4,3)	**Land Ethics**: A thing has value or is good insofar as it promotes the integrity, stability, and beauty of the biotic community. Biotic community includes humans, non-humans, species, and ecosystems all interacting as a system. From Aldo Leopole, Sand County Almanac; **Virtue Environmental Ethics**: Approach centers on virtues as habits that promote sustainable transactions with the natural environment. Hursthouse provides a provocative example with the virtue, respect for nature.(4,4)	**Willingness-to-sell**: Resource is owned by the public so its value is determined by its selling rather than buying price. This frees bid fromdisposable income. Now value becomes more reflective of the identity-conferring beliefs and attitudes of a community and its members.(4,5)

System of the Natural Environment

Ethics of STS Research

- **Right of Free and Informed Consent**: This is the right of participants in a research project to know the harms and benefits of the research. It also includes the right not to be forced to participate in a project but, instead, offer or withdraw voluntarily their consent to participate. When preparing a STS analysis, it is mandatory to take active measures to facilitate participants's free and informed consent.

- Any STS analysis must take active measures to recognize potential harms and minimize or eliminate them. This is especially the case regarding the information that may be collected about different individuals. Special provisions must be taken to maintain confidentiality in collecting, storing, and using sensitive information. This includes careful disposal of information after it is no longer needed.

Participatory Observation

- As we said above, a socio-technical system (STS) is "an intellectual tool to help us recognize patterns in the way technology is used and produced." Constructing these tools requires combining modes of analysis that are ordinarily kept separate. Because STSs embed values, they are normative. These values can help to chart out trajectories of change and development because they outline values that the system needs to realize, maintain, or even enhance. In this way, the study of STSs is normative and a legitimate inquiry for practical and professional ethics. On the other hand, STS analysis requires finding out what is already there and describing it. So STS analysis is descriptive as well. In this textbox, we will talk briefly about the descriptive or empirical components of STS analysis. This material is taken from the draft manuscript of Good Computing: A Virtue Approach to Computer Ethics and has been developed by Chuck Huff.
- **Interviews**: Semi-Structured and Structured Interviews conducted with those familiar with a given STS provide an excellent source of information on the constituents of a given STS and how these fit together into an interrelated whole. For example, the STS grid on power systems was put together by experts in this area who were able to provide detailed information on power rates and protocols, software used to distribute energy through the gridlines, and different sources (representing both hard and soft technologies) of power generation.
- **Field Observation**: Those constructing a STS analysis go directly to the system and describe it in its day-to-day operation. Two books provide more information on the types and techniques of field observation: 1. David M. Fetterman, Ethnography: 2nd Edition, Applied Social Research Methods Series, Vol 17. London, UK.: Sage Publishers, 1998 and 2. James P. Spradley, Participant Observation. New York, Harcourt, 1980. The data collected in this method can also be used to construct day-in-the-life scenarios that describe how a given technology functions on a typical day. These scenarios are useful for uncovering value conflicts and latent accidents. See James T. Reason, Human Error, Cambridge, UK.: Cambridge University Press, 1990 for information on latent accidents, how they are detected, and how they are prevented.
- **Questionnaires**: Questionnaires are useful for gathering general information from large numbers of people about a STS. Constructing good questionnaires is a difficult process that requires patience as well as trial and error. (Trying out questions on classmates and friends is the best way to identify unclear or misleading questions.) Avoiding complex, overly leading, and loaded questions represent a few of the challenges facing those who would construct useful questionnaires.
- **Archival and physical trace methods**: Looking at user manuals provides insight into how a system has been designed and how it works. Studying which keys are worn down on computer keyboards provides information on the kind of work being done. Comparing how a system is intended to work with how it is in fact being used is also illuminating, especially when one is interested in tracing the trajectory of a STS. Working with archival and physical trace methods requires critical thought and detective work.
- None of the above methods, taken in isolation, provides complete information on a STS. Triangulation represents the best way to verify data and to reconcile conflicting data. Here we generate evidence and data from a variety of sources then compare and collate. Claims made by interviewees that match direct on-site observations confirm one another and indicate data strength and veracity. Evidence collected through questionnaires that conflicts with evidence gathered through archival research highlights the need for detective work that involves further observation, comparison, interpretation, and criticism.
- Developing STS analyses bears a striking resemblance to requirements analysis. In both cases, data is collected, refined, and put together to provide an analysis. A key to success in both is the proper combination of normative and descriptive procedures.

Exercise 1: Make a Table that Describes the Socio-Technical System

Directions: Identify the constituents of the Socio-Technical System. Use the broad categories to prompt you.

1. What are the major hardware and software components?

2. Describe the physical surroundings.
3. What are the major people groups or roles involved?
4. Describe any procedures in the STS.
5. Itemize the laws, statutes, and regulations.
6. Describe the data and data structures in your STS. Use the two templates below that fill in this table for energy generation systems and for engineering ethics in Puerto Rico.

	Hardware	Software	Physical Surroundings	People, Groups, Roles	Procedures	Laws	Data and Data Structures

Socio Technical System Table

Exercise 2: Identify Value Mismatches in the STS

Directions: identify the values embedded in the STS. Use the table below to suggest possible values as well as the locations in which they are embedded.

1. **Integrity**: "Integrity refers to the attributes exhibited by those who have incorporated moral values into the core of their identities. Such integration is evident through the way values denoting moral excellence permeate and color their expressions, actions, and decisions. Characteristics include wholeness, stability, sincerity, honesty to self and others, suthenticity, and striving for excellence.
2. **Justice**: Justice as fairness focuses on giving each individual what is his or her due. Three senses of justice are (1) the proper, fair, and proportionate use of sanctions, punishments and disciplinary measures to enforce ethical standards (retributive justice), (2) the objective, dispassionate, and impartial distribution of the benefits and burdens associated with a system of social cooperation (distributive justice), (3) an objectively determined and fairly administered compensation for harms and injustices suffered by individuals (compensatory justice), and (4) a fair and impartial formulation and administration of rules within a given group.
3. **Respect**: Respecting persons lies essentially in recognizing their capacity to make and execute decisions as well as to set forth their own ends and goals and integrate them into life plans and identities. Respects underlies rights essential to autonomy such as property, privacy, due process, free speech, and free and informed consent.
4. **Responsibility**: (Moral) Responsibility lies in the ability to identify the morally salient features of a situation and then develop actions and attitudes that answer to these features by bringing into play moral and professional values. Responsibility includes several senses: (1) individuals are responsible in that they can be called upon to answer for what they do; (2) individuals have responsibilities because of commitments they make to carrying out the tasks associated with social and professional roles; (3) responsibility also refers to the way in which one carries out one's obligations (This can range from indifference to others that leads to minimal effort to high care for others and commitment to excellence)
5. **Free Speech**: Free Speech is not an unlimited right. Perhaps the best place to start is Mill's argument in **On Liberty**. Completely true, partially true, and even false speech cannot be censored, the latter because censoring false speech deprives the truth of the opportunity to clarify and invigorate itself by defending itself. Mill only allows for a limitation of free speech based on harm to those at which the speech is directed. Speech that harms an individual (defamatory speech or shouting "fire" in a crowded theatre) can be censored out of a consideration of self-defense, not of the speaker, but of those who stand to be harmed by the speech.
6. **Privacy**: If an item of information is irrelevant to the relation between the person who has the information and the person sho seeks it, then that information is private. Privacy is necessary to autonomy because control

over information about oneself helps one to structure and shape one's relations with others.

7. **Property**: According to Locke, we own as property that with which we have mixed our labor. Thomas Jefferson argues that ideas are problematic as property because, by their very nature, they are shared once they are expressed. They are also nonrivalrous and nonexclusive.

Drawing Problems from Embedded Values

- Changes in a STS (e.g., the integration of a new technology) produce value mismatches as the values in the new component conflict with those already existing within the STS. Giving laptops to children produces a conflict between children's safety requirements and the safety features embedded in laptops as designed for adults.
- Changes within a STS can exaggerate existing value conflicts. Using digitalized textbooks on laptop computers magnifies the existing conflict concerning intellectual property; the balance between copyrights and educational dissemination is disrupted by the ease of copying and distributing digitalized media.
- Changes in STS can also lead to long term harms. Giving laptops to children threatens environmental harm as the laptops become obsolete and need to be safely disposed of.

	Hardware	Software	Physical Surroundings	People, Groups, Roles	Procedures	Laws
Integrity						
Justice						
Respect						
Responsibility for Safety						
Free Speech						
Privacy						
Intellectual Property						

Values Embedded in STS

Using Socio-Technical System Grids for Problem Specification

The activity of framing is a central component of moral imagination. Framing a situation structures its elements into a meaningful whole. This activity of structuring suggests both problems and solutions. Framing a situation in different ways offers alternative problem specifications and solution possibilities. Since skillful framing requires practice, this part of the module suggests how socio-technical system tables can help provide different frames for problem specification and solution generation.

Different Problem Frames

- **Technical Frame**: Engineers frame problems technically, that is, they specify a problem as raising a technical issue and requiring a technical design for its resolution. For example, in the STS grid appended below, the

Burger Man corporation wishes to make its food preparation areas more safe. Framing this technically, it would be necessary to change the designs of ovens so they are more accident-proof.

- **Physical Frame**: How can the Burger Man corporation redesign its restaurants as physical facilities to make them more accessible? One way is to change the access points by, say, designing ramps to make restaurants wheel chair accessible. Framing this as a physical problem suggests solutions based on changing the physical structure and arrangement of the Burger Man STS.
- **Social Frame**: Burger Man as a corporation has stakeholders, that is, groups or individuals who have an essential interest at play in relation to the corporation. For example, framing the problem of making Burger Man more safe as a social problem might suggest the solution of integrating workplace safety into worker training programs and conducting regular safety audits to identify embedded risks.
- **Financial or Market-Based Frames**: Burger Man is a for-profit corporation which implies that it has certain financial responsibilities. Consequently, Burger Man should be concerned with how to provide safe, child-proof chairs and tables that do not cut unduly into corporate profits. But like the legal perspective, it is necessary to conduct ethical and social framing activities to compensate for the one-sidedness of financial framing.
- **Managerial Frame**: Many times ethical problems can be framed as managerial problems where the solution lies in changing managerial structures, reporting relations, and operating procedures. For example, Burger Man may develop a specific procedure when a cashier finishes a shift and turns over the cash register and its contents to another cashier. Burger Man may develop cleaning procedures and routines to minimize the possibility of serving contaminated or spoiled food to customers.
- **Legal Frame**: Burger Man may choose to frame its environmental responsibilities into developing effective procedures for complying with OSHAA and EPA regulations. Framing a problem legally certainly helps to identify effective and necessary courses of action. But, because the ethical and social cannot be reduced to the legal, it is necessary to apply other frames to uncover additional risks not suggested by the legal framing.
- **Environmental Framing**: Finally, how does Burger Man look from the environmental standpoint? Does it consider environmental value (environmental health, safety, and integrity) as merely a side constraint to be addressed only insofar as it interferes with realizing supposedly more important values such as financial values? Is it a value to be traded off with other values? (For example, Burger Man may destroy the local environment by cutting down trees to make room for its latest restaurant but it offsets this destruction through its program of planting new trees in Puerto Rican tropical rain forests.) Framing a problem as an environmental problem puts the environment first and sets as a goal the integration of environmental values with other values such as worker safety and corporate profits.

Burger Man Socio-Technical System Table
https://cnx.org/content/m14025/

Clicking on this figure will open as a Word file a STS table based on the fictional corporation, Burger Man. Below are a list of problems suggested by the STS analysis.

Media File Uplinks

This module consists of two attached Media Files. The first file provides background information on STSs. The second file provides two sample STS grids or tables. These grids will help you to develop specific STSs to analyze cases in engineering, business, and computer ethics without having to construct a completely new STS for each case. Instead, using the two tables as templates, you will be able to zero in on the STS that is unique to the situation posed by the case. This module also presents background constraints to problem-solving in engineering, business, and computer ethics. These constraints do not differ absolutely from the constituents of STSs. However, they pose underlying constraints that outline the feasibility of an ethical decision and help us to identify obstacles that may arise when we attempt to implement ethical decisions.

Socio-Technical Systems
https://cnx.org/content/m14025/

Socio-Technical Systems:
Constituents, Values,
Problems, and Constraints.

STS Templates
https://cnx.org/content/m14025/

Two STSs, Power
Engineering and the
Puerto Rican Context of
Engineering Practice.

Socio-Technical Environments Table
https://cnx.org/content/m14025/
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Value Profile: Respect
This module profiles respect, one of the five values included on the Statement of Values prepared by the College of Business Administration at the Unviersity of Puerto Rico at Mayaguez

Respect: Recognizing and Honoring Rights

Respect is one of the five values included in the Statement of Values developed by the University of Puerto Rico's College of Business Administration. The following statement of respect was drafted by a committee of academic stakeholders in 2006:

Acknowledge the inherent dignity present in its diverse constituents by recognizing and respecting their fundamental rights. These include rights to property, privacy, free exchange of ideas, academic freedom, due process, and meaningful participation in decision making and policy formation.

The purpose of this module is to explore this value further by developing a conception of rights that are treated as modes of respect for human autonomy.

Along these lines, this module will present a framework for explaining and justifying rights and showing the correlativity between rights and duties. This framework is useful to explain and clarify widely accepted rights claims as well as to examine critically less widely accepted, more controversial rights claims. The content of the rights-based approach is summarized below in a table. Different sense of autonomy, loosely interpreted from Ética Para Ingenieros, help to provide a rough justification for the notions of rights. Finally, exercises help students progress from justifying and understanding non-controversial rights claims, to examining more questionable (and complex) rights claims, to examining rights in the context of community development and appropriate technology.

Six Statements on Rights

1. Definition: A right is an essential capacity of action that others are obliged to recognize and respect. (The key word is "essential." Essential here means essential to the development and maintenance of autonomy. For more on autonomy see below.)

2. Definition: A duty is a principle that obliges us to recognize and respect the autonomy of others (and of ourselves).

3. Correlativity of right and duty. Rights and duties are correlative; for every right there exists a series of duties that spell out how to recognize and respect the corresponding right, who should recognize and respect this right claim, and on what occasions.

- Note that duty and right are defined, one in terms of the other. A right is a capacity of action that others are obliged (=have a duty) to recognize and respect. A duty obliges us to recognize and respect the autonomy (=rights) of others.
- For every right, there is a correlativity duty to recognize and respect that right claim. (Actually a whole series or levels of correlative duties).
- Rights (as modes of exercising autonomy) while essential to being human are also fragile, that is, vulnerable to certain kinds of threats. If the capacities or capabilities bundled under a right are not exercised or protected from these standard threats, then they disappear. (For example, humans are capable of speech but only if at certain key developmental times, they are exposed to and stimulated by speech.)

4. Rights claims have to be justified. A claim is a legitimate right if…

- It harbors a capability, the exercise of which is essential to autonomy. For example, without general and specific information, one cannot exercise one's agency in an autonomous fashion. Thus informed consent is essential to autonomy.
- It remains vulnerable to a "standard threat." For example, one cannot exercise autonomous agency if one is deceived or if information crucial to responsible, autonomous action is covered over or withheld. Hence, a standard threat to informed consent is presenting false information or covering up true and vital information.

- That the correlative duties it requires to recognize and respect autonomy do not deprive the duty-holders of anything essential. For example, I may have a right to life but that right cannot be extended to the point where I can oblige another to sacrifice her life so that I might live. To assert my right to life at the expense of others is to deprive them of something essential to their autonomy, namely, their life.

5. For every right there are correlative duties to (a) not violate or deprive another of that right, (b) prevent others from depriving individuals of their rights, and (c) aid those who have been deprived of their rights and thus restoring their dignity and autonomous agency. These duties can rest on duty-holders who are individuals or on collectives such as organizations or institutions. For example, individuals have the duty not to deprive others of their privacy by hacking into their email accounts and reading their messages. On the other hand, the institution of civil law provides a means of aiding those who have been deprived of rights like privacy and property. This represents a collective rather than an individual duty-holder.

Table on Rights and Duties

Concept	Definition	Elaborations	Examples
Right	An essential capacity of action that others are obliged to recognize and respect.	Framework to justify right claims: (a) **Essential** to autonomy; (b) **Vulnerable** to a standard threat; (c)	Some Key Rights in Business: Free and Informed Consent, Due Process, Privacy, Free Speech, Property, and

		Feasible in that recognizing and respecting right claims does not deprive the duty-holder of something essential.	Freedom of Conscience
Duty	A principle that obliges us to recognize and respect the autonomy of others (and of ourselves).	Duty Levels: (a) Not to deprive; (b) Prevent deprivation; (c) Aid the deprived	These two Kantian Principles encapsulate respect for Autonomy: (1) **Categorical Imperative**: Act only on that maxim that can be made into a universal law; (2) **Formula of the End**: Treat others always as ends and never merely as means.
Correlativity of rights and duties	The definition of right	Because rights and duties are	This is a controversial thesis.

	includes the concept of obilgation or duty. The definition of duty is built around recognizing and respecting rights.	defined in terms of one another they are correlative; for every right there is a series of correlative duties.	Nevertheless, the correlativity thesis harbors the truth that rights neither exist nor function in a vacuum. To characterize rights as claims is to imply that they are claims over someone to do something. Especially important is the notion that rights identify capacities of action that are vulnerable to standard threats.
Rights Justification Framework	To establish a rights claim as legitimate, one must prove that the claim is...	(1) **Essential** to autonomy; (2) **Vulnerable** to a "standard threat"; (3) **Feasible** in that it imposes on the duty-	In relating the right claim to autonomy, remember to connect it to one of the four senses of autonomy discussed below: (1)

		holders an obligation whose execution does not deprive them of something essential.	Self-Choice; (2) Self-Legislation; (3) Authenticity; (4) Self-Decision.
Identifying Correlative Duties	Correlative duties form levels and often proceed from basic individual duties to social or collective duties	(a) Duty **not to deprive** an individual of a right; (b)Duty to **protect others from being deprived** of their rights; (c) Duty to **aid those who have been deprived** of their rights.	**The first two correlative duties are generally carried out by individuals**: (a) For example, one cannot deprive others of their rights to informed consent by withholding information; (b) If someone else is withholding information and one can prevent deprivation by revealing this information, then one has a duty to do so; (c) But often

			societies collectively aid those who have been deprived of their rights by creating legal procedures that those suffering rights deprivations can appeal to.

Rights as modes for recognizing and respecting autonomy

Four Senses of Autonomy: Self-Choice, Self-Legislation, Authenticity, and Self-Decision

In this module, rights have been explained as capacities of action that are necessary to the exercise of human autonomy. In this section, autonomy will be characterized as self-choice, self-legislation, authenticity, and self-decision following **Ética Para Ingenieros**, 2a Edición, by Galo Bilbao, Javier Fuertes, and José Ma Guilbert, Universidad Jesuistas, 160-164. Bilbao, Fuertes, and Guilbert draw from the writings of Diego Gracia, in **Fundamentos de Bioética**, Eudema, Madrid. What follows draws upon but also takes some liberties with the accounts by Diego Gracia as well as Bilbao, Fuertes, and Guilbert.

1. The literal meaning of autonomy comes from the Greek words, auto (=self) and nomos (=law).
Thus, autonomy is literally the ability to give the law to oneself, to legislate for oneself. This presupposes that one can adopt a rational and universal standpoint and design rules or maxims that apply equally to oneself and to all others. I develop rules and guidelines for myself that, at the same time, I can consistently will for all others.

2. Autonomy as self-legislation ties in closely with Kant's Categorical Imperative and Formula of the End.
The Categorical Imperative holds that **I can act only on that maxim (=personal or subjective rule) that can be converted into a universal law (=rule that applies to all)**. Cheating for example, fails the CI because its maxim (I can copy from another when I need to) is self-defeating when universalized. (Why?) The Formula of the End states that **I must treat humanity (myself included) always as an end and never merely as a means**. Whenever I lie, deceive, force, manipulate or impose fraud on another to achieve my ends, I seek to circumvent that person's autonomy; I bring her into the scope of certain projects without getting her explicit and full rational consent. (I ask an acquaintance out for a date, not because I value her as a person, but because I want to make my ex-girlfriend jealous.)

3. Many say that the ability to exercise autonomy as self-legislation rests upon the ability to take the moral point of view.
Here one takes up the position of the other through a skill moral psychologists call "role-taking." I project into the standpoint of another and view the action I am considering from her perspective. If this action is as acceptable from her perspective as it is from mine, then it is reversible, and thereby recommended.

4. Autonomy can also be characterized as the synthesis of freedom from and freedom to.

- **Freedom from** is liberty, the absence of obstacles that stand in the way of what an agent wants to do. Because of this, freedom from is the negative sense of autonomy; it clarifies what opposes autonomy and must be removed to facilitate it. But freedom from does not provide a positive account of what one does after all obstacles to action have been removed.
- **Freedom to** is the positive characterization of autonomy. It spells out what I do when I have achieved freedom from. It requires a conception of the good as well as identity-conferring projects that I work to bring about. It also sets forth side constraints such as Kant's Categorical Imperative and Formula of the End. Thus, I develop life plans whose realization requires access to the means to carry them out. But these plans are pursued within the constraints that Kant sets forth in the

Categorical Imperative and Formula of the end; I can solicit the help of others in pursuit of my projects but only if I do so without circumventing their autonomy through deception, force, manipulation, or fraud.

- Isaiah Berlin provides an especially clear and persuasive account of freedom to and freedom from in his article "Two Concepts of Liberty."

5. Bilbao, Fuertes, and Guilbert distinguish four senses of autonomy

1. Autonomy as **self-choice (autoelección)**. This sense covers the negative sense of freedom, freedom from obstacles to pursue my preferences and wishes. Mill gives voice to this conception of autonomy in his book, On Liberty. (See his classical defense of freedom of speech.) Autonomy in this sense is based on the removal of obstacles that impede my exercise of freedom. Thus, the right to an education is characterized as removing obstacles to my becoming educated; it also gives me access to means of becoming educated. What I learn, the content of my education, is left open to determination by the individual; Mill sets forth an indefinite and wide range of options for exercising "freedom to."

2. **Autonomy as self-legislation (autolegislación)**. As described above this is the Kantian sense in which individuals exercise the capability of giving the law to themselves. This includes a moral aspect or dimension: we discipline our individual lives by developing rules to guide our own lives that can also be extended to all others. We conceive of ourselves and others as living within what Kant terms a "kingdom of ends" where all, because they possess certain human capacities, are entitled to being treated always as ends and never merely as means. This sense of autonomy is the one most explicitly tied to respect.

3. **Autonomy as authenticity (autenticidad)**. This sense of autonomy recognizes the extent to which the individual is influenced by his or her social and natural environment. For example, the philosopher F.H. Bradley carries out a thought experiment based on removing everything English from the English person and asking what is left over after this abstraction. Removing language, cultural norms, experiences generated interacting with others and rendering the

individual an isolated social atom deprives the individual of all determining content. Thus, Bradley terms the remainder an "I know not what" residuum; emptied of all social content, the individual becomes merely an indeterminate placeholder. This sense of autonomy starts from the fact that we are social beings who are shaped (enabled and constrained) by our social and natural context. It then shows how we find ourselves as individuals in this social experience and then act responsively: (a) I can criticize my social being and reject the social forces that work to constrain and channel my actions; or I can accept or acquiesce to these forces and choose to define myself by loyalty to my social context. Either way, I recognize myself in this social space and take responsibility for it by choosing my response. Much of this approach is captured by Existentialism; (b) This can also be understood in terms of moral development. For Kohlberg, the conventional levels of moral development are characterized by individuals making decisions based on what others think or advocate. For example, one conforms to others and bases one's choices on what is recommended by "authorities"; (c) One reaches post-conventional levels of moral development by questioning authority and other external sources of moral conduct. This is purchased through the achieving of critical distance by exercising the skills of moral imagination like multiple framing of one's situation or by role-taking to gain insight into the perspective of others.

4. **Autonomy as self-decision (autodecisión)**. This sense is closely related to the previous sense of authenticity in that it involves recognizing oneself as embedded in a natural and social context, and then taking responsibility for one's subsequent choices, habits, and character as made within this context. In a manner different from Bilbao, Fuentes, and Guilbert, I will characterize self-decision along the lines of self-realization following Taylor, Aristotle, and Bradley: (a) According to Taylor, one finds oneself in a social and natural situation through "strong evaluation." Here one questions one's fundamental commitments (those that constitute one's identity) in a radical and fundamental way. Taylor characterizes strong evaluation as a **hermeneutical** act where one uses one part of one's self to attend to and question the other parts. (b) Aristotle also sets forth a self-realization ethics. Virtue (=arête) exercises and realizes those

capabilities which are most fully human. By exercising virtue, we realize our natures (and our selves) and become fully happy (=eudaimonia). (I have inserted the Greek words, arête and eudaimonia to show that Aristotle's concepts are only partially translatable.) (c) Bradley puts this differently. I realize myself by taking up a social station within society and performing its attached duties. Bradley makes use of an organic metaphor to characterize his version of self-realization. By taking up a social station and performing its duties, the individual becomes a functioning organism within society which is now viewed as a social or moral organism. The heart pumps blood throughout the body; by performing its function it also helps the body as organim to stay alive. Individuals by performing the duties of the moral organism help keep this moral order alive and properly functioning. (How do engineers and business persons contribute to the social good?)

Two thought experiments on autonomy

Mountain Terrorist
1. The Mountain Terrorist. One is visiting a remote village when, suddenly, it is overrun by terrorists. They line all the inhabitants in the village against a wall with the intention of killing them. When you remonstrate with the terrorists not to do this, they give you a choice: you can, yourself, select a villager and kill him or her with a gun they provide; or you can choose to do nothing in which case they revert to their original plan to kill everybody. Bernard Williams uses this thought experiment to point out the limits of utilitarianism which would dictate that one should kill a villager in order to save the rest. Perhaps this course of action would maximize utility. But how does it stand with one's sense of self and autonomy? For example, killing an innocent villager might be so disruptive of one's autonomy that it undermines future agency. It might go against one's identity-forming commitments or projects. If so, then guilt from killing an innocent person would undermine one's core beliefs, disrupt self and identity, and render future authentic action difficult if not impossible.
2. George the Chemist must choose between carrying out his responsibilities to his family and remaining true to his pacifism by

refusing to work with a company that would use his knowledge of chemistry to build war weapons.

- Are those who insist that George set aside his pacifist beliefs interfering with his autonomy? If so, to which sense of autonomy are you referring? Self-choice, self-legislation, authenticity, or self-decision?
- Many students have characterized George's reluctance to pursue work with the company that manufactures weapons as self-indulgence. They would say that while George's pacifism is important to George's sense of identity, he should be willing to sacrifice this in order to carry out his responsibilities to his wife and children. But if George sets aside fundamental commitments (like his pacifism) can he still remain integral and authentic?

What you are going to do

Exercise One: Use the frameworks presented in the table above to justify the following rights: informed consent, due process, privacy, property (physical and intellectual), free speech, freedom of conscience. Answer the following questions about each right.

1. Define or describe the right. Include an example.
2. Provide an argument that the right claim in question is essential to autonomy. That is, what capacity of action is protected by the right claim? How does the exercise of this capacity help an individual formulate and execute life plans that fulfill basic (rational?) desires? Why is the capacity of action essential and not merely trivial? (e.g., I have a right to scratch my nose in public when it itches.)
3. How is the capacity of action that the right protects vulnerable? (Why does it need protecting?) In other words, identify a standard or common threat that undermines an individual's ability to exercise this capacity of action.
4. What are the duties that are correlative to your right? Who are the duty-holders? What must others do to keep from violating your right claim? What kinds of agents are in a position to prevent others from

depriving you of your right? What kind of social mechanisms should be created to aid those who have been deprived of their rights?

5. Is the right claim feasible? For example, you may have a right to life. A standard threat to this capacity of action (and being) may be failure in both kidneys. But does your right to life compel another, say a stranger, to donate a kidney to save your life? Does this mode of exercising your right deprive another of something essential?

Exercise Two: Use the frameworks to examine the following rights claims. Use the steps spelled out in Exercise One. Does the rights claim you are examining satisfy the steps in exercise one?

- right to a livable environment
- right to have adequate food, clothing, and shelter
- right to an abortion
- right to form unions and the right to strike
- right to have gainful employment (right to a job)
- right to an education
- right to full medical care

Exercise Three: Martha Nussbaum in Women and Human Development portrays "two women trying to flourish."

1. Vasanti was compelled to marry at a young age. In her caste, women are generally treated as property; she went from the family in which she was raised to the family of her husband. Like property, her husband was free to dispose of her as he saw fit. He beat her, forced her to work, and took the wages she earned through work and spent them on his leisure and on alcohol. In order to fund his alcohol habit, he had a vasectomy for which he received payment from the government. This ensured that he and Vasanti would not have children, something Vasanti wanted for her emotional fulfillment and economic security.

- Does Vasanti have the right not to be treated as property?
- How would this right be formulated?
- What does it include? (For example, does it include the right not to be beaten or the right to be protected from forced, conjugal sex?)
- What essential capacities of action would this right protect?

- Do women like Vasanti have this right even though they may not be aware of it due to what is termed "preference deformation?"

2. Jayamma carried bricks for a living in order to support her family. Although her work was harder than that performed by men she was paid less than them. When she became too old to continue with this arduous labor, she applied for relief. The Indian government denied her relief because she had sons who were able to support her. Yet her sons, for various reasons, were not willing to support her. Her daughter, who was willing to support her, was a registered nurse. Yet she was not able to practice because she could not pay the money necessary to bribe hospital officials to give her a job.

- Does Jayamma have a right to equal pay (and equal treatment) in her employment? Does this right exist in itself or must it be derived from another, more fundamental right?
- If Jayamma has such a right, how can her society aid her as one who has been deprived of this right?
- Do Jayamma's sons have a duty to support her now that she is too old to work? If so, to what right is this duty correlative?
- Does Jayamma's daughter have a right to work in the profession (nursing) for which she is qualified? If so, what is the standard threat present in this situation that must be addressed to protect her right to work? How are the duties correlative to this right to work to be spelled out and distributed? (What individuals have which level of correlative duty? What organizations exist or could be devised to carry out some or all of the correlative duties?)

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Value Profile: Justice
Justice is the first value in the University of Puerto Rico, College of Business Administration's Statement of Values. The purpose of this profile is to provide a more in-depth look at this important value. It will examine the core meaning of justice (justice as a fair agreement stemming from a social contract), its key features, different kinds of justice (distributive, retributive, compensatory, administrative), some useful frameworks in justice, cases involving justice, and a social contract exercise to convey the concept's core meaning. This profile will eventually be combined with profiles of the other four SOV values in a collection to be used in verifying and challenging ADEM's Statement of Values. It will be subjected to updates as the author continues research into this area and also has chance to assess in the classroom the success of the exercise the module offers.

Value Profile: Justice

The root or core meaning of justice is giving to each what is due.

Suppose you are moving and are trying to decide how to pay the three workers who are helping you. Giving each his and her due might simply consist of paying all three the same amount. This version of what is due is egalitarian. Or you might give a bit more to the worker whose oldest child is sick and needs expensive medical treatments. This version of giving each what is due is more necessitarian, that is, distributing on the basis of need. Or you could wait until the move has already occurred and give the most to the worker who did the most; this could be termed a merit-based approach to what is due. This example is presented in different sources. One is Beauchamp and Bowie (1988). **Ethical Theory and Business, 3rd Edition**. Upper Saddle, NJ: Prentice-Hall, p. 552.

Justice, then, in its core sense implies a distribution of something that accords with our common ideas of fairness, equality, merit, and impartiality.

Moving from this core meaning, justice classically divides into different senses. These are different senses distinguished by Manuel Velasquez (2006), *Business Ethics: Concepts and Cases*, *6th ed*. Upper Saddle River: NJ: Prentice-Hall, p. 88.

1. **Distributive Justice** examines how to divide and allot fairly the benefits and harms that result from social cooperation.
2. **Retributive Justice** concerns itself with the fair and impartial administration of punishment to wrongdoers.
3. **Compensatory Justice** scrutinizes how we fairly compensate those who have been wrongfully harmed by others.
4. **Administrative Justice** looks at how rules are fairly and impartially administered in a social, political, or organizational context.

Justice, Hobbes, and the Social Contract

Many have worked to derive a conception of justice a version of the social contract. The exercises in this module have you look at justice as resulting from procedures derived from Thomas Hobbes (1588-1679) and John Rawls (1921-2002). (Hobbes selections come from Steven Cahn (editor), Classics of Western Philosophy, 2nd Edition. Indianaplis, IN: Hackett Press (1985): 361 and 368. Those on Rawls come from *Theory of Justice* or *Ethical Theory and Business* (edited by T Beauchamp and N Bowie, Upper Saddle, NJ: Prentice-Hall, 1988, pp. 559-567.

Hobbes sees the social contract as a procedure that takes us from a State of Nature (which is identical to a State of War) to Civil Society. Each contract has a *quid pro quo*, a mutually beneficial exchange. Individuals agree to lay down their natural liberties because these, combined with the acquisitiveness of human nature, have led to a state of war of all against all. To enforce this contract, each individual transfers his or her natural rights and powers to a sovereign who is charged with enforcing the contract they have made with one another.

This reduces to a formula: Rational Self-Interest + Knowledge of Human Nature + Natural Equality between all human individuals = a State of War. Why? Because human individuals are characterized individually by unlimited desire; without some check unlimited individual desire leads to conflicts between different individuals who desire the same thing.

The state of war is for Hobbes is highly undesirable. Life in the State of Nature is "solitary, poor, nasty, brutish, and short."

"Hereby it is manifest, that during the time men live without a common power to keep them in awe, they are in that condition which is called war; and such a war, as is of every man against every man....Whatsoever there is consequent to a time of war, where every man is enemy to every man; the same is consequent to the time, wherein men live without other security, that what their own strength, and their own invention shall furnish them withal. In such a condition there is no place for industry; because the fruit thereof is uncertain: and consequently no culture of the earth; no navigation, nor use of the commodities that may be imported by sea; no commodious building; no instruments of moving, and removing, such things as require much force; no knowledge of the face of the earth; no account of time; no arts; no letters; no society; and which is worst of all, continual fear, and danger of violent death; and the life of man, solitary, poor, nasty, brutish, and short." T. Hobbes. (1651). **Leviathan: Edited with an Introduction by C. B. MacPherson** Middlesex, England: Penguin Books, p. 186.

Key Terms

Rational Self-Interest: For Hobbes, humans want to stay alive. Rational self-interest dictates that the individual will do whatever is necessary to ensure continued survival.

State of Nature: The absence of laws, social norms, and customs. Each has the liberty to do what he or she wants. Nothing but the opposition of other human individuals stands in the way of an individual fulfilling desire. Hobbes, viewing human nature through the lens of physics and the natural sciences, characterizes state of nature as a social and political vacuum where one pursues whatever one desires. Because desires do not limit themselves, unless they are unlimited from the outside, they lead individuals to come into conflict with one another. The State of Nature is nothing other than a State of War of all against all.

Human Nature: Hobbes' conception of human nature has been termed "possessive individualism" by C. B. Macpherson.

- First, the individual is an atom isolated from other individuals and from any kind of social or natural context. Each human individual has a nature prior to and independently of society.
- Second, if this individualism is possessive, then it is characterized by unlimited desire. Humans are determined by their desires and passions. So if two or more individuals desire the same thing, then conflict is inevitable.
- Third, Hobbes assumes a natural equality among human individuals. This doesn't mean that everyone has the same powers or that no individual has more of any power than another. All it need mean is that even the most powerful among us is unable to so completely dominate others that he or she can lock a guarantee on peace and security.

Justice for Hobbes
In Chapter XV of the Leviathan, Hobbes defined justice: *From that law of nature, by which we are obliged to transfer to another, such rights, as being retained, hinder the peace of mankind, there followeth a third which is this, that men perform their covenants made: without which, covenants are in vain, and are but empty words; and the right of all men to all things remaining, we are still int he condition of war. And in this law of nature, consisteth the fountain and original of justice. for where no covenant hath preceded, there hath no right been transferred, and every man has right to everything; and consequently, no action can be unjust. But when a covenant is made, the to break it is unjust: and the definition of injustice, is no other than the not performance of covenant. And whatsoever is not unjust, is just.* T. Hobbes. (1651). **Leviathan: Edited with an Introduction by C. B. MacPherson** Middlesex, England: Penguin Books, p. 201-202.

Rousseau's criticism
Rousseau (1712-17178) provides an insightful criticism of Hobbes. He argues that Hobbes did not dig deep enough in his effort to reach human nature prior to its reconstitution by civil society. The acquisitive desires that Hobbes uses to describe Human nature in its pre-social form are actually, themselves, the products of civilization itself. They are introduced along with the notion of private property. Rousseau sees this as a degeneration from original human nature, the noble savage whom he views romantically.

[Hobbes] had wrongly injected into the savage man's concern for self-preservation the need to satisfy a multitude of passions which are the product of society and which have made laws necessary. The evil man, he says, is a robust child. It remains to be seen whether savage man is a robust child....Moreover, their is another principle that Hobbes failed to notice, and which, having been given to man in order to mitigate, in certain circumstances, the ferocity of his egocentrism or the desire for self-preservation before this egocentrism of his came into being, tempers the ardor he has for his own well-being by an innate repugnance to seeing his fellow men suffer....I am referring to pity, a disposition that is fitting for beings that are as weak and as subject to ills as we are; a virtue all the more universal and all the more useful to man in that it precedes in him any kind of reflection, and so natural that even animals sometimes show noticeable signs of it. Rousseau, "Discourse on the Origin of Inequality, Part One," in Jean-Jacques Rousseau: The Basic Political Writings. Indianapolis, IN: Hackett (1987): 53.

Justice, Rawls, and the Veil of Ignorance

Rawls on Justice
In his 1971 book, **Theory of Justice,** John Rawls constructed a thought experiment to find the basic principles of **distributive** justice. Rawls begins with the central problem of distributive justice. The goods, harms, and risks that accompany social cooperation must be fairly and justly distributed. Three methods of distribution present themselves as leading candidates: equality, merit, and need.

- *Equality*: the benefits, harms, and risks of social cooperation are distributed equally among members of the social group.
- *Merit*: the greatest share goes to those who deserve it. Merit can be defined in terms of knowledge, skill, productivity or even moral virtue.
- *Need*: the greatest share goes to those who have the greatest need.
- Beauchamp and Bowie add distribution according to rights, effort, and societal contribution. Beauchamp and Bowie, **Ethical Theory and Business, 3rd Edition**, p. 44.

Rawls then constructs a thought experiment designed to solve this problem of distribution. Imagine a situation where a group of rationally self-interested individuals choose principles of distribution under a veil of ignorance. (This means that individuals will be making this choice unaware of their own special circumstances, for example, whether they will be rich or poor, born in a wealthy nation or in a developing country, endowed with natural talents or handicapped in some way, etc.)

1. Rational self-interest leads us to acquire as many primary goods as possible. These include (a) rights and liberties, (b) opportunities and powers, and (c) income and wealth.
2. Under the veil of ignorance, we pretend to know nothing of our situation. As Rawls puts it, under the veil of ignorance, **"no one knows his place in society, his class position or social status, nor does any one know his fortune in the distribution of natural assets and abilities, his intelligence, strength and the like."** (J. Rawls (1971). **A Theory of Justice**. Cambridge, Mass: Harvard University Press, p. 12)

The veil of ignorance channels rational self-interest toward an impartial and fair system of distribution. Without the veil of ignorance, those who are rich would gravitate toward a scheme of distribution that maintained and even enhanced their wealth. Those who were poor would opt for a scheme that redistributed the wealth of others to themselves. The scheme could also be shifted towards one's natural talents: if one were strong, one would choose a system of distribution biased toward strength; if one were intelligent, one would choose a system of distribution that rewarded intelligence; if one were male, one would choose a system that favored men. Rational self interest without the veil of ignorance would bias the principles of justice chosen. But the veil of ignorance pushes rational self-interest toward impartiality because the rationally self-interested individual must choose to protect all possibilities, not knowing in advance which one will apply.

With this in mind, Rawls' basic position can be summarized in the following manner:

1. Rational Self-Interest + Veil of Ignorance = Theory of Distributive Justice.

Distributive Justice, in turn, is captured by two principles: the Equal Liberties Principle (ELP) and the Difference Principle (DP)

1. ELP = Equal Liberties Principle: *"First: each person is to have an equal right to the most extensive basic liberty compatible with a similar liberty for others." "The basic liberties of citizens are, roughly speaking, political liberty (the right to vote and to be eligible for public office), together with freedom of speech and assembly; liberty of conscience and freedom of thought; freedom of the person along with the right to hold (personal) property; and freedom from arbitrary arrest and seizure as defined by the concept of the rule of law."* (Rawls, A Theory of Justice, pp. 60-61)
2. DP = Difference Principle: *"Second: social and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone's advantage [most especially to those most disadvantaged] and, (b) attached to positions and offices open to all...."* (Rawls, A Theory of Justice, pp. 60-61) One further point on the difference principle requires emphasis: *"social and economic inequalities, for example inequalities of wealth and authority, are just only if they result in compensating benefits for everyone, and in particular for the ;least advantaged members of society."* (Rawls, A Theory of Justice, 14-15.)

The Equal Liberties Principle has priority over the Difference Principle so that equality becomes the default pattern of distribution; any departure from an equal pattern of distribution must have a strong, overriding justification. Moreover, the equal distribution of political liberties is, for Rawls, absolute and cannot be overridden. (Rawls, thus, overcomes what he sees as a weakness of utilitarianism that allows the overriding of basic rights and liberties to bring about the greatest good for the greatest number.) But, under the Difference Principle, a departure from equality can be justified in the economic sphere if all stand to benefit, most especially the disadvantaged. In this way, Rawls works toward a synthesis that captures the strengths of three patterns of distribution: equality, merit, and need.

Rawls' theory of justice has been intensely debated and scrutinized. From the libertarian standpoint, Nozick criticizes Rawls for developing a system of justice that sacrifices liberty for equality. Nozick argues that a patterned system of justice (like Rawls') must continually interfere with a distribution voluntarily reached to maintain a privileged pattern of distribution. (To put it crudely, Nozick argues that Rawls' system of justice would require continual transfer of wealth and goods from those who have more to those who have less. One such mode of transfer is, of course, taxation. So Nozick points out that under Rawls' system we would pay loads of taxes.)

Nozick provides an interesting example of how patterned systems of distribution interfere with liberty. Suppose we voluntarily transfer our money to Michael Jordan to see him play. We enjoy the show but now Jordan has a disproportionate share of the total wealth, as judged by our ideal pattern of distribution, namely, equality. So to restore justice, we take back some of Jordan's money—through taxation—and redistribute it to those who gave it to him in the first place. Overriding the initial, voluntary transfer by a second involuntary transfer doesn't make sense to Nozick. Moreover, he finds it wrong because it sacrifices liberty to equality (or some other privileged pattern of distribution). For Nozick, the current pattern of distribution is not important. What matters is how it came to be. If the current pattern was produced by a just process, then it is a just distribution no matter how unequal it may be. Nozick defines this just process as repeated applications of justice in acquisition (we made it or added value to it) and justice in transfer (somebody bought it from us or received it as a gift without force or fraud). (This analysis loosely follows R Nozick. (1974) **Anarchy, State, and Utopia**, New York: Basic Books, pp. 149-154, 156-157, 159-163, 168, 174-5, 178-179, 182.) These selections can be found in Beauchamp and Bowie. (1988). **Ethical Theory and Business, 3rd Ed**. Upper Saddle, NJ: McGraw-Hill, pp. 567-570. The Wilt Chamberlain example has been updated to the Michael Jordan example.)

The table below summarize much of the discussion in this module to this point. It also refers to some point that are beyond the scope of this module. For example, Sandel provides a communitarian criticism of Rawls. Rawls' self can be detached from its social surroundings and defined in terms of rational self-interest. Sandel argues that justice must confront more robust selves or individuals who are inseparable from their social context. Hence, the social contract itself (or Rawls' original position) must always factor in the projects and social relations that partially constitute who we are. Second, Walzer argues that there are spheres of justice that correspond to different practical areas; each sphere has its own distinct principle or procedure of distribution and these different procedures cannot be reduced to one all-inclusive view. So economic goods can be distributed consequentially but political goods must have some kind of right-based or deontological procedure. Third and finally, Nussbaum and Sen see justice as following from a more robust conception of human dignity that is filled out by substantive freedoms or what they term capabilities. M. Nussbaum. (2006). **Frontiers of Justice: Disability, Nationality, species Membership**. Cambridge, Mass: Belknap Press.

Root meaning	Key Features	Kinds and Senses	Useful Frameworks	Cases
Giving each what is due—places justice under the debits/credit metaphor	Pattern Approaches: Justice = the conformity of current distribution to an ideal pattern • **Equality** or equal shares of benefits and burdens • **Merit** or the most to those who merit or deserve it • **Need** or the most to those who have the greatest needs	**Distributive**: dividing burdens and benefits of social cooperation fairly.**Retributive**: fair and impartial administration of rewards and punishments	Social Contract Version One • Agents pursuing self-interest • Negotiating out of condition of equality in SN • Agreement reached among parties exchanging liberties to secure rights represents a just procedure	Hughes • Does provic victim wrong dismis adequ means redres

Root meaning	Key Features	Kinds and Senses	Useful Frameworks	Cases
Justice as fairness and justice as equality • First emphasizes impartiality • Second emphasizes equality	**Historical Process View**: if the current distribution results from a process free of coercion and deception, then it is just. • **Justice as Entitlement** results from repeated applications of … • **Justice in acquisition** (mixing one's labor with an object) • and **Justice in transfer** (voluntary exchange of goods between individuals) Michael Jordan is entitled to his larger share if collectively we have transferred our money to him to watch him play.	**Compensatory**: fair compensation for wrongful injuries**Administrative**: Impartial and fair administration of rules and procedures (consistent with due process)	Rawls Version: Social Contract under veil of ignoranceRational Self-Interest (maximize primary goods) + Veil of Ignorance (Ignorance of natural talents, gender, social class, economic and political status, etc.) = Procedural Justice as spelled out in two principles:1.*Equal Liberties Principle*: "Each person is to have an equal right to the most extensive basic liberty compatible with a similar liberty for others."2. *Difference Principle*: "social and economic inequalities…are just only if they result in compensating benefits for everyone, and in particular for the least advantaged members of society." (Rawls, Theory of Justice in Beachamp and Bowie Business Ethics, 561.)	Incident at • Do maqu repres distri econo goods risks? Consi especi lower and lo enviro and sa standa Intuition P • 3 stud help y move needy skille the th availa (share

Root meaning	Key Features	Kinds and Senses	Useful Frameworks	Cases
Metaphor: Justice emerges out of a social contract • agents with rational self-interest (utility maximizers) • mutually beneficial exchange or *quid pro quo* • knowledge and comprehension of terms of *quid pro quo* • Voluntary (Free and informed Consent)	In general processes of acquisition and transfer must be liberty-preserving or free from coercion and deception	Justice can be treated as a **right** essential to autonomy, vulnerable to a standard threat and feasible in that it does not deprive the correlative duty-holder of anything essential**Utilitarianism**: Justice is intrinsically valuable but only as a part of happiness (especially happiness of the greatest number)	These two principle allow for maximizing primary goods (=rational self-interest) under a veil of ignorance according to RawlsPrimary Goods: • rights and liberties • opportunities and powers • income and wealth	CEO Pay • Justifi under histor proces • Justifi under equali merit
Justice has been characterized in different ways as a … • right essential to autonomy • good essential to human happiness • virtue or disposition of character of human agent		**Spheres of Justice** (Walzer): There are several distinct spheres of practical activity, each with its own rule of distributive justice. (Examples: Educational, Political, Economic)		One Lapto Child • Do X(laptop provid means reduce digita betwe develo develo nation

Exercise A

Introduction
As you have seen in the material above, justice can be at least partially derived from an imagined social contract where rationally self-interested individuals negotiate how society should distribute access to primary goods such as (1) liberties and rights, (2) opportunities and powers, and (3) wages and wealth. Social contract theory thus devises a negotiation whose end result generates principles and procedures of distributive justice. In this activities section, you will carry out two different versions of the social contract, one without what Rawls terms a veil of ignorance and the other under the veil of ignorance.

First, you will participate in a natural lottery. From a hat (or box) you will draw one of the following:
The Natural Lottery

- You (or your group) has been born as a woman
- You (or your group) has been born as Michael Jordan. (You have talents that would make you an excellent basketball player if these are properly developed.
- You (or your group) has been born as Albert Hirschmann, a German of Jewish dissent who comes of age in the 1930s in Nazi Germany. You have extraordinary mental talents and have a good preliminary education but are now living in a world where people of your descent are the objects of persecution.
- You (or your group) has been born as a graduate from the Harvard MBA program.
- You (or your group) has been born in a nation that occupies what is now called the "Global South." (Haiti would be a good example.)
- You (or your group) has been born as a Black man who has always lived in Detroit, MI.

Some key assumptions to guide you all through the negotiation process.

- Your group has interests that need to be protected in this process. You can try to integrate interests, compromise interests, or tradeoff interests with one another.
- You and the other parties to the contract are rationally self-interested. As such you are interested in maximizing access to Primary Goods such as rights and liberties, opportunities and powers, income and wealth.
- You are willing to accept constraints to your primary goods but only if other groups also do so. In other words, you should not unilaterally give up your group's access to any primary goods since these compose rational-self interest and are also essential to survival.
- This contract is supposedly neutral as to different conceptions of the self, for example, whether the self is essentially or non-essentially related to any community. But it tends in the direction of what MacPherson terms "possessive individualism." In this case, there is a human nature that is prior to an independent of any relation to other individuals or to a community. Hobbes reduces this human nature to acquisitiveness or unlimited desire. Locke and Rousseau see a "fellow feeling" as balancing or checking acquisitive desire.

Negotiate a new social contract with the other groups.
Negotiate a contract whose structure represents the best procedure for distributing goods, risks, and harms among the different stakeholders listed in one. Be prepared to defend your contract against claims that it privileges one of these groups over another.
Begin by answering the following questions:

1. What are your group's interests, needs, or desires?
2. Does your group have its fair share of primary goods: (1) Liberties and Rights, (2) Opportunities and Powers, (3) wealth and income
3. Are your interests/access to goods being met under the current system of distribution?
4. If not describe/prescribe a redistribution process to give your group what is "its due."

Exercise B

1. Now, renegotiate this contract under a veil of ignorance. The same classes will emerge in the system of justice you are creating by your contracting: Political leaders (legislators, judges, mayors, etc); Wealthy Individuals; Individuals with High Intelligence; Individuals with Low Intelligence; Poor); Members of Minority Groups; Women; Men. Only now, your task will be to negotiate a procedure of distribution under a veil of ignorance. You will enter into this system and come to occupy one of these roles, but at this point of negotiation, you do not know which of these roles.

2. As in Exercise A, you are negotiating on the basis of Hume's circumstances of justice:

- Each group has interests that need to be protected in this process. Different group interests can be reconciled through compromise, integration, or tradeoff.
- You and everyone else are rationally self-interested. As such you are interested in maximizing for your group Primary Goods such as rights and liberties, opportunities and powers, income and wealth.
- All negotiating parties are equal. But the roles bracketed by the veil of ignorance are not equal. How would you take this into account in the negotiation?

- Obviously your position will be constrained by the other parties in the negotiation. But, because of the veil of ignorance, you don't know how that constraint will take place. What kind of negotiation stance can you take under the veil of ignorance? Again, remember that you want to maximize your acquisition of primary goods (rights and liberties, powers and opportunities, wealth and income). But this maximization cannot be brought about by privileging any of the roles mentioned above. You may be rich but you may be poor; you may be smart but you may be not so smart; you may be a man but you may be a woman. How do you insure maximize access to primary goods under these conditions?
- This contract is supposedly neutral as to different conceptions of the self, for example, whether the self is essentially or non-essentially related to any community. But it tends in the direction of what MacPherson terms "possessive individualism." In this case, there is a human nature that is prior to an independent of any relation to other individuals or to a community. Hobbes reduces this human nature to acquisitiveness or unlimited desire. Locke and Rousseau see a "fellow feeling" as balancing or checking acquisitive desire.

3. Negotiate a new procedure for distributing primary goods, risks, and harms under this veil of ignorance. Describe in detail your procedures.

Exercise C

1. Compare the procedure you developed in Exercise A with the pattern based approach of Rawls. Did you come up with something like the Equal Liberties Principle and the Difference Principle? Compare your procedure with Nozick's Historical Process procedure. Which comes closest to the Hobbesian conception of distributive justice?

2. Compare the procedure you developed in Exercise B with the pattern based approach of Rawls. Did you come up with something like the Equal Liberties Principle and the Difference Principle? Compare your procedure with Nozick's Historical Process procedure. Is this process compatible with a negotiation under the veil of ignorance? Finally which theory seems most compatible with your negotiation in Exercise B, the pattern based approach or the historical process approach?

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Value Profile: Integrity
This module is one of several that provides an in-depth examination of the values included in College of Business Administration's (from the University of Puerto Rico at Mayaguez) Statement of Values. It highlights the features of this value, provides a summary table, and uses exercises to reflect on the importance and on the different dimensions of integrity. This module is part of a collection of modules that explores all five values included in the Statement of Values: justice, responsibility, respect, trust, and integrity. It is also developed as part of an NSF-funded project, the EAC Toolkit--NSF SES 0551779 and relates to the ongoing NSF project, GREAT IDEA.

Introduction

(The Standford Encyclopedia has an excellent article on integrity by Damian Cox, Marguerite La Caze, and Michael Levine. Visit http://plato.stanford.edu/)

Integrity has been identified as a core commitment of the University of Puerto Rico's College of Business Administration. Robert Solomon, a virtue business ethicist, has characterized integrity as a meta-virtue whose function is to unify and integrate all the other virtues. Of course, while it is controversial whether integrity is a virtue, it is clearly a value and of great importance in the College of Business Administration's moral perspective.

The Statement of Values, approved in May 2006 by College of Business Administration stakeholders is described there in the following way:

Promote integrity as characterized by sincerity, honesty, authenticity, and the pursuit of excellence. Integrity shall permeate and color all its decisions, actions and expressions. It is most clearly exhibited in intellectual and personal honesty in learning, teaching, mentoring and research.

This characterization has been a source of difficulty for students in Business Administration who frequently confuse it with trust and responsibility. It is also a point of controversy within the College of Business Administration as to whether integrity is a meta or unifying value or whether it is a separate value that stands by itself.

This module will cover integrity by setting forth its different senses or aspects, providing a table that summarizes these different senses, and by offering students a series of exercises that give them an opportunity to reflect on some of the difficulties raised in the literature that discusses this important concept.

What you need to know

1. Integrity has five different senses

1. **Integrity involves integration that brings about unity or wholeness.** A person of integrity over the long haul works to unify and integrate the constituents of character (its different traits) into a single, coherent identity. Among those constituents are emotion, thought, value, commitments, projects, beliefs, and attitudes
2. **Integrity involves consistency** of action across situations and over long periods of time. (For example, this time span could encompass a entire career or even a lifetime). The Milgram experiments pose a special challenge to this sense of integrity; normally decent individuals act immorally in specially constrained situations under direct pressure. These results are cited to undermine the claim that character traits are robustly trans-situational and that integrity as consistency of action across situations is unfeasible as a moral ideal. But a weaker, more likely conclusion is that consistency of action is possible although difficult; it requires rigorous moral training where students practice and come to dominate strategies for resisting the forces that undermine character expression. The Hitachi Report (ref) provides grounds for developing strategies for designing and maintaining a moral career by setting forth the

different organizational environments in which professionals work, how they challenge and constrain moral choice and action, and the different ways in which professionals participate in decision-making. Organizations can be built around different goals depending on whether they are driven by financial, customer, or quality based objectives. Each organizational environment presents different challenges to the professional who would maintain a moral career. Moral education becomes more individualized by helping students to identify the environment in which they will work and then offering strategies and skills particular to each for forging a moral career. Alongside this emphasis on organizational context is a new literature from business ethics devoted to values-based decision-making. For example, Mary Gentile's "Giving Voice to Values: How to Speak Your Mind When You Know What's Right" empowers students to stand up for and advocate moral values; it helps them by presenting procedures for resisting pressures toward wrongdoing. Another factor that promotes consistency is moral courage; this virtue empowers one to act consistently across situations even in the face of daunting challenges and formidable pressures to the contrary.

3. **Commitment**: A person of integrity has a self-system built around moral beliefs and values. This moral content represents identity-forming commitments that express themselves through the choices, actions and projects carried out by an individual. Moral psychologist, Augusto Blasi, shows how integrity results from an educative process where an individual successfully integrates moral values and beliefs into the core of his or her "self-system." Emotions, beliefs, attitudes, etc., provide vehicles for integrating value into the self-system. This process underlies the socialization of students into the non-moral values of a profession through formal and informal education. But Blasi focuses on the integration of moral content into the self-system and how this integration makes moral value a primary motive for action. Having successfully integrated moral value into the central self system, a person of integrity expresses moral value and moral character through his or her choice of action and conduct over a career. In this way, moral action expresses moral character. Conversely, should a moral agent do something wrong, this action goes against character and creates an identity crisis; how does the agent become responsible or own up to action that, because it is immoral, is clearly "out of character?"

4. **A person of integrity is a person of strong and focused conviction**. He or she takes a stand—often a courageous stand—on the side of moral value. This sense of integrity applies especially where moral value is at risk; the person of integrity will stand up to this threat motivated by strong moral commitments, beliefs, and attitudes. This sense is closely related to the commitment sense; a person of integrity has something for which he or she takes a stand and in which he or she strongly believes. The opposite here would be what Martin Benjamin terms the moral chameleon; like a chameleon, this person lacks conviction and changes moral convictions and beliefs to match what dominates the immediate environment. Thus moral chameleon lacks any convictions strong enough to serve as the basis for "taking a stand."

5. **Incorruptible**: This sense is especially important in Latin American countries like Puerto Rico. Corruption has come to represent the unethical and the anti-ethical taken in the broadest sense. Thus, a person of integrity is the opposite of one who is corrupt; integrity points to the manifestly uncorrupt and incorruptible. Moral integrity here implies that the agent's self system is solidly integrated around moral value. She is able to resist forces that threaten the unity of the self from both internal and external sources. Internally, one becomes corrupt by abandoning integration around moral value to impulse, desire, inclination, passion, and appetite. External corruption is generated by strong pressures toward wrongdoing that are generated by the organizations within which we work and live. A supervisor orders one to do something illegal or immoral; a peer steals from the organization claiming that everybody does it; organizational roles cover over one's moral identity and lead one imperceptibly into taking on another persona in which wrongdoing is habitual. One opposes internal corruption by placing moral values in control over impulse, desire, inclination, passion, and appetite. One opposes external corruption by "going to the mat" in defense of moral value; one takes on the role of "giving voice to" moral value and moral considerations in organizational decisions, actions, and policies.

2. Integrity can be understood as a virtue

According to Aristotle, a virtue is **"a state of character concerned with choice, lying in a mean, i.e., the mean relative to us, this being determined by a rational principle, and by that principle by which [a person] of practical wisdom would determine it."** (From Ross's translation of the Nichomachean Ethics in 1106b, 36.) Characterizing integrity as a virtue emphasizes integrity's role in the choice of action in specific situations and in achieving consistency in choice of action throughout a professional career and even a lifetime. For Aristotle, moral virtue is characterized by a style of choice and career that consistently and even systematically avoids the vices of excess and defect. Integrity's vice of excess lies in action and habits that tend toward rigidity and inflexibility; here the agent holds to a position no matter what and does so even in the face of overwhelming evidence to the contrary; such a person falls prey to unreasonableness and irrationality. Integrity's other vice, its vice of defect, emerges when the individual acts as a moral chameleon, a hypocrite, or a wanton. (Martin Benjamin in Splitting the Difference vividly describes the hypocrite and moral chameleon; Frankfurt characterizes the moral wanton as the psychotic whose actions are so inconsistent and unconnected that they express no, underlying, unified character.) Alongside these vices of excesses and defect are the vices of internal and external corruption described just above; internal (psychological) and external (organizational) corruption break down the integration of value, habit, emotion, and belief that characterizes the moral agent.

3. Integrity as a Meta-Virtue, a virtue about the relation between virtues.

Many have characterized **integrity as a special kind of virtue, a meta-virtue**. In this case the subject matter of integrity consists of all the other virtues and how they fit in with one another. A person of integrity finds ways of integrating all the virtues so that she is truthful **and also** courageous, honorable **and also** humble, just **and also** compassionate. While there is nothing in the definition of the individual virtues that leads one to contradict another, in certain situations individual virtues become difficult to integrate. A strong sense of honor may lead one to act or appear arrogant; honor thus takes on the appearance of opposing humility because their integration in this situation is difficult. The fair and impartial judge may appear cold and devoid of compassion when she asserts justice over compassion in her decision. Integrity, because it pertains to all the virtues and to the relation in which they stand to one another, is a **meta-virtue**, one that posits the seamless

4. Ways for building integrity: strong evaluation and aligning first and second-order desires.

- In Charles Taylor's strong evaluation test, integrity emerges out of an intensive and radical examination of one's core self. This examination evaluates identity-conferring beliefs, emotions, attitudes, and projects in terms of different moral "horizons." Taylor's test is hermeneutical because one can never completely step outside of one's self when carrying out strong evaluation. Instead, one examines one part of the self using other parts that are kept provisionally outside the scope of criticism and examination. Then one reverses the poles of evaluation; what was formerly the target of strong evaluation now becomes the means of carrying out a new evaluation; and what provided the means of strong evaluation now becomes the target of a new evaluation. Because it is hermeneutical, strong evaluation is never complete; one is continually bootstrapping toward a more thoroughly understood and seamlessly integrated self by working toward higher and higher levels of refinement.
- Frankfurt also provides a test for integrity by distinguishing between first and second order desires. At the first level, I may desire to smoke a cigarette; I have been smoking for quite some time and feel a craving for one right now. Second-order desires evaluate first-order desires; I crave a smoke at the first level but now find smoking undesirable at the second level; second-order desires thus take an evaluative stance toward first-level desires. A new, moral goal has emerged that challenges me to reshape my first-order desires. I work to reduce my craving for a cigarette because I now find cigarettes undesirable; they are harmful, expensive, and annoy my friends. I take special measures to reduce my first order craving to align it with my second order project.

- In Taylor's test, integrity emerges from a continual, intensive, and radical evaluation of my self-system in terms of its central, identity-conferring content. In Frankfurt's test, integrity emerges as second-order desire motivates me to realign first-order desire.

5. Self-Deception, as put forth by Herbert Fingarette, presents an unusually strong challenge to integrity

Fingarette characterizes self-deception as the refusal to avow or acknowledge a part of oneself; one indirectly recognizes this undesirable part of the self but by refusing to "spell it out," one leaves it outside the unity of the self. Thus, self-deception arises from the failure to integrate all the constituents of the self. Furthermore, self-deception is a form of corruption, what Collingwood characterizes as a "corruption of consciousness." One attends to one element in the field of consciousness in order not to attend to another, undesirable element. This project of disattention permeates and corrupts what is attended to. The racist projects the undesired characteristics he disavows for himself upon the targeted group. This hatred of others is really a corrupt form of self-hatred, disguised by projecting the rejected parts of the self onto the external target of racist attitudes. The disavowal of self-deception can never be contained; refusing to integrate the disavowed element with the rest of the self leads to an eventual, overall disintegration of the self. For this reason, self-deception presents a singularly strong challenge to integrity.

Core Meaning or Root Metaphor(1,1)	Description(1,2)	Features(1,3)	Exercises on Integrity(1,4)	Cases(1,5)
Integration,Unity, or Wholeness: a person of integrity unifies character constituents into a single, coherent identity. Components integrated: emotion, thought, values, commitments, projects, beliefs, and attitudes. (2,1)	Integrity functions as a meta-virtue or a meta-value. This means that it prescribes coherence and consistency between the individual virtues of the character or the values that form the core of one's thought and conduct.(2,2)	Vices of excess: (a) rigidity and inflexibility (b) fanaticism or sticking to a position no matter what; (c) unreasonableness; (d)irrationality. (2,3)	Some use Milgram's experiments to argue that situation determines character and action. There are, according to this position, no trans-situational character disposition or traits.(2,4)	**Nathaniel Borenstein** reformulates and reintegrates his pacifist beliefs (without abandoning them) to help NATO develop a missile launch training program not embedded in the actual launching system.(2,5)
Consistency of action across situations that	Integrity is often characterized as a virtue, that is,	Vice of Defect: moral chameleon, hypocrite, and	Some conclude from Zimbardo's	**Jim and the Jungle**: Utilitarianism

follows from a fully synthesized and integrated character. The same character trait, disposition, or habit is displayed across different kinds of situations.(3,1)	as an excellence of character, thought, and action. Character is formed around four Cardinal Virtues: Prudence, Justice, Fortitude, and Temperance. (Taken from the Encyclopedia of Catholicism) (3,2)	wanton. (See Frankfurt and Benjamin on these types of defect.)(3,3)	prison experiments that identity dissolves into the role one is playing. The students role-playing in his experiment as prisoners and as prison guards become so lost in their roles that they lose their sense of identity.(3,4)	and Deontology may dictate that one shoot the villager or leave the scene but they do not properly take into account the cost of either action on personal integrity.(3,5)
Commitment: a person of integrity has central beliefs and values to which he or she remains faithful. He or she has something to believe in and thus stands out as a "person of conviction." (4,1)	According to Aristotle, a virtue is "a state of character concerned with choice, lying in a mean, i.e., the mean relative to us, this being determined by a rational principle, and by that principle by which [a person] of practical wisdom would determine it." (From Ross's translation of the Nichomachean Ethics in 1106b, 36.)(4,2)	**Vices of Corruption**: External-- disintegration of organizational, group, or collective integrity or unity(4,3)	**Strong Evaluation Test**: Is it possible to subject core self to rigorous self-examination? Difficulty: Finding an Archimedean point.(4,4)	**George the Pacifist**: George does not want to work on a weapons project because it violates his strong, core beliefs in pacifism. But he is unemployed and his wife needs to quit her waitress job to go back to school and be with the children.(4,5)
Incorruptible: The coherence or solidity of one's core self can stand up to disruptive pressures such as extraneous desire or pressure from the outside.(5,1)	As a virtue, integrity is the mean between extremes of excess and defect.(5,2)	**Internal Vice of Corruption**: Disintegration of individual integrity or unity/cohesion of character(5,3)	**Consistency of first with second-order desires**: Frankfort posits the existence of two levels of desire, first/immediate and second/mediate. The gambler gives way to	**A Man for All Seasons**: Play author, Robert Bolt, presents Thomas More as a paradigm of integrity. Susan Wolf, on the other hand, presents him

			first-order desire to keep on gambling. But second-order desire, opposes the first, and advocates a project to stop gambling. (At which level does the true self arise?) Integrity = aligning first with second order desires. (5,4)	as a religious fanatic. Would More lose his integrity if he signed the oath?(5,5)

Summary Table on Integrity

What you are going to do.

Exercise I: Does Character Exist?

The following is quoted from Gilbert Harmon's article, "The Nonexistence of Character Traits."
Virtue ethicists do not and need not argue that most people are indeed virtuous or could in principle become virtuous' (Athanassoulis, 1999). But if we know that there is no such thing as a character trait and we know that virtue would require having character traits, how can we aim at becoming a virtuous agent? If there are no character traits, there is nothing one can do to acquire character traits that are more like those possessed by a virtuous agent.
Examine each of the premises set forth in this argument.

- Is it the case that there is no such thing as a character trait? (For example, do the Milgram experiments show that character traits displayed in one situation disappear when one enters into a different situation? Does the fact that a significant minority of subjects refused to continue in the experiment provide evidence that it is possible to develop robust character traits or is this just a matter of luck?)
- Does virtue ethics rest on the assumption that there are robust, trans-situational character traits? (Do robust character traits have a basis in nature? Can these be developed by, say, practicing to the point of becoming "second nature?")
- In other words, does the inconsistency of action across situations displayed in the Milgram experiments undermine the claim that virtue ethics is possible?

Exercise II: Must George sacrifice his integrity to meet his family's needs?

George is a chemist. He recently received a Ph.D. in this area and demonstrated considerable skill and knowledge in a highly specialized and sought after area of this discipline. But George is also unemployed. His wife has had to quit school and work as a waitress. They have two children and, even though George shares care-giving and domestic duties with his wife, it would be better if his wife could quit her job, go back to school, and have more time to be with her children. Finally, George is a pacifist. Since his expertise in Chemistry has military applications (specifically in the development of weapons in chemical warfare), it is

possible for George to find work but only in positions that go against his pacifist beliefs. George's friend, Antonio, informs him of a job possibility with Mega Weapons, a company whose revenues come primarily from government military defense projects. Antonio can get George an interview with Mega Weapons, and, given the scarcity of people with George's expertise, this interview will probably result in a well-paying job. George however expresses concern with taking on such a job given that it would go against his pacifist beliefs. George is highly committed as a pacifist; these beliefs have been integrated into his core self system.

Questions

- Should George set aside his pacifist beliefs in order to carry out his family responsibilities?
- Under what conditions would setting aside his pacifist beliefs undermine George's integrity?
- By sticking to his pacifist beliefs and refusing to pursue this job opportunity, is George falling into the vice of excess, fanaticism and unreasonableness?
- If George sets aside his pacifism and takes a job with Mega Weapons, does he fall into the vice of defect, namely, does he become a hypocrite or a moral chameleon?

Exercise III: Is there such a thing as unity of character and unity of virtue?

Codes of ethics in engineering enjoin engineers to associate only with individuals of "good character."

- Why is this important? For example, if one associated with individuals of bad character, would this corrupt one's own character?
- Take a field from the following list: engineering, business, government, science, agriculture. What would be the attributes or traits that would designate one as having a good character within this field? What kind of things would one do? What kind of person would one be? Do you know of anyone in your field that you would consider a good character? A bad character?
- Imagine an engineer who exhibits the characteristics that you have used to define an engineer of good character. Now imagine that, even though married with children, this individual had an extramarital affair. Would this additional fact diminish your estimation of this individual as one of good character?
- The view that one must have all the virtues to be good is a position called the "unity of the virtues" and it has been attributed to Aristotle. Is this necessarily true? In order to be a good business person, must one also be virtuous in one's family life? Did President Clinton's affair with Monica Lewinski diminish his performance and integrity as president?

Exercise IV: Saints of Selfhood, Persons for all Seasons, and Dirty Hands

- Robert Bolt's play, A Man For All Seasons, portrays Thomas More as a "saint of selfhood." More and several other characters express different modes of selfhood through how they respond to a single, vital political issue of their time.
- Henry VIII took Catherine of Spain as his first wife. To do so he had to receive a special dispensation from the Pope because she was previously married; this previous marriage and the Catholic Church prohibition of remarriage thus created the necessity of receiving special permission from the Catholic hierarchy.
- But after several years of marriage to Henry, Catherine had failed to give birth to a son; Henry became obsessed with the fact that there was still no heir to the throne of England. In the meantime, Henry had fallen in love with Lady Anne Boleyn and wanted to marry her. He felt that Catherine's barrenness was punishment from God for the illegitimacy of the marriage. He was also confident that Anne, who was younger, could bear him a son. Now Henry went to the Pope asking him to "dispense with his dispensation," declare the marriage to Catherine null and void, and give consent to the new marriage to Anne Boleyn. The Pope refused.
- Henry went on with this second marriage in defiance of the Pope. Eventually this led the Church of England to separate itself from the Church of Rome. But Henry's more immediate problem was dealing

with opposition to the marriage arising from English citizens faithful to the Catholic Church and Rome. Henry felt that this opposition represented illegitimate interference in the political affairs of England on the part of outsiders. To ferret them out, Henry demanded that all citizens take an oath of loyalty which affirmed the illegality of Henry's marriage to Catherine, the legitimacy of the marriage to Anne Boleyn, and the acceptance the children she bore Henry as the legitimate heirs to the throne of England.

- A series of larger political and religious issues "telescoped" themselves into this familial problem. (1) What is the relation between the Catholic Church and the State of England? (2) How could Henry's successor be determined and legitimized? (3) How could Henry's succession be planned out so as to avoid civil conflict and civil war? (4) How could conscientious citizens of England reconcile their political obligations with their religious faith? All of this entailed that Henry's oath required all of those taking it to choose between Church and State. If one had integrated religious beliefs into one's self-system, then this choice translated into the alternatives of self-affirmation and self-denial.

Your task in this exercise is to explore the different approaches to integrity taken by four characters in Bolt's play: Thomas More, Thomas Cromwell, Richard Rich, and Thomas Howard, the Duke Norfolk. How does each approach this situation? Does the character's approach preserve or betray integrity? Is preserving integrity compatible with compromises like the one suggested by Norfolk: take the oath and publicly affirm the legitimacy of the marriage while internally and privately denying its legitimacy? How does one preserve integrity and avoid betraying or abandoning one's deepest self as outlined by strong religious and political convictions?

1. Thomas More

- More refused to take the oath. For him, an oath is an especially strong promise, made before God, in which one offers one's very self as guarantee. Accepting Norfolk's proposal, publicly affirming the marriage while privately and internally repudiating it had very real consequences for More that would result in the loss of self, the betrayal of conscience, and the destruction of his "moral compass." As More put it at one point, abandoning one's conscience for the sake of political expedience was the sure road to political corruption and chaos. While Bolt portrays More as a "saint of selfhood," Susan Wolf (in her historical novel on Cromwell) presents him as a religious fanatic, one who would hold to religious dogma even to the point of civil war and social destruction.
- **Question**: Is More a saint of selfhood or a religious fanatic?

2. Richard Rich

- Rich begins as an admirer of More. But he is also ambitious, so when More refused him a political appointment, Rich found a new patron in the Machiavellian politician, Thomas Cromwell. (More did offer Rich a teaching post, but this clearly was not enough to satisfy Rich's political ambitions.) Rich's career advanced nicely through Cromwell's patronage but at a price to personal integrity. To get his first appointment, Cromwell asked Rich to provide incriminating evidence against More. Rich found this betrayal difficult but after pressure from Cromwell, gave in. Cromwell assured him that it will be easier next time. Rich proceeded step-by-step toward the point where he was able to betray More and convict him of treason by perjuring himself as a witness; he falsely testified that More declined to take the loyalty oath for treasonous reasons. More told Rich that he had lost his soul with this lie but Rich eventually rose to the exalted position of Chancellor of England.
- **Questions**: Did Rich betray More? Did Rich abandon integrity for personal gain? Or were Rich's actions an appropriate political response to More's religious fanaticism?

3. Thomas Cromwell

- Thomas Cromwell described himself as a civil servant devoted to the king, whoever he was. Thus his position could be characterized as uncritical loyalty. If the king wished for something, then Cromwell asserted that it was his duty to see to it that he got it. Cromwell's special talent was removing political and bureaucratic obstacles. If his means seemed extreme (he prosecuted More for treason and brought about his execution), Cromwell justified these by the legitimacy of the ends they were meant to bring

about. Henry, for Cromwell, was more than just a man; he was the King of England and his desires could be re-described as the collective and common good of the people of England. Cromwell, thus, sided with the political side of the Church vs. State dispute. He saw his actions as the proper political response to More's religious fanaticism.

- **Questions**: Did Cromwell preserve or abandon integrity through his actions? To what extent do legitimate political ends justify taking extreme administrative measures? Is it necessary to "dirty one's hands" in order to realize social and political goods as well as to avoid political disasters like civil war? At one point, More affirmed that he would like to see England's affairs "governed by prayer." Does Cromwell represent the practical antidote to this utopianism?

4. Norfolk

- Norfolk belonged to the English aristocracy and his family had its own claim to the English throne. Yet, as Norfolk confessed to More, the aristocracy caved in to Henry on the matter of the marriage in order to protect its own position and secure its important position in the English familial hierarchy. Norfolk conceded that Henry was wrong but that this was irrelevant. Because Henry had the power to do what he wanted, it would be useless for the aristocracy to oppose him. They should wait for Henry to die and then assert themselves in the power struggle that would follow his death. If this resulted in civil war, then so be it. In the meantime, More should join the aristocracy and take the oath for fellowship if for nothing else.
- **Questions**: How does Norfolk's position stand in regard to integrity? Consider the values of the English aristocracy: honor, tradition, courage, and fortitude. Did Norfolk remain true to these aristocratic values? Can these values be temporarily set aside in the face of the superior power of one particular aristocratic family, the Tudors?

Imagine a continuum between integrity, on the one end, and insincerity, corruption, and betrayal on the other. Now arrange these characters on this continuum. Who would you consider a saint of integrity? Who do you feel best falls on the opposite end of the scale? Can you invent any strategies for preserving personal integrity in the face of such a polarized political debate?

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Value Profile: Trust
This module is one of several that provides an in-depth examination of the values included in College of Business Administration's (from the University of Puerto Rico at Mayaguez) Statement of Values. It highlights the features of this value, provides a summary table, and uses the Prisoner's Dilemma to help students visualize the importance and fragility of trust. This module is part of a collection of modules that explores all five values included in the Statement of Values: justice, responsibility, respect, trust, and integrity. It is also developed as part of an NSF-funded project, the EAC Toolkit--NSF SES 0551779 and relates to the ongoing NSF project, GREAT IDEA.

Introduction

Trust is one of five values identified by the College of Business Administration at the University of Puerto Rico at Mayagüez for inclusion in its Statement of Values. These values were identified in a workshop held in 2005. There participants explored values in different codes of ethics, identified the values embodied in the rules they drafted to guide daily conduct, and carried out selection and prioritization activities to refine and reduce a large list of candidate values to five. A committee of stakeholders (administration, faculty, staff, and students) studied the values and wrote out short descriptions of each. Finally, the Statement of Values and its value profiles have been subjected to different challenges. Stakeholders have translated the SOV into Spanish, tested it for comprehensiveness using case studies, and used test results in classes to hone in on conceptual ambiguities. The SOV provides the following formulation of trust:

Recognize that trust solidifies communities by creating an environment where each can expect ethically justifiable behavior from all others. While trust is tolerant of and even thrives in an environment of diversity, it also must operate within the parameters set by established personal and community standards.

This conception of trust as the expectation of moral behavior from others comes largely from Robert Solomon. This module will build on Solomon's treatment by integrating it with that of Margaret Urban-Walker in her book, **Moral Repair: Reconstructing Moral Relations after Wrongdoing**. Trust is absolutely essential in constructing moral transactions and building a civilized life. But wrongdoing can disrupt--even destroy--social transactions, leaving civil ruin in its wake. As Urban-Walker explores the different ways to carry out moral repair, the restoration of trust emerges as an essential component. For example, she lists six tasks as constitutive of moral repair. Trust plays an essential role in the following two (MR 28):

- "Moral repair is served by replenishing or creating trust among individuals in recognition of shared moral standards and in their responsiveness to those standards and support of the practices that express and support them."
- "Moral repair is served by igniting or nourishing hope that moral understandings and those who are responsible for supporting them are worthy of trust."

Trust as a Concept

Below are five statements about trust that bring out important components about this concept. Moral concepts are not as easily defined or applied as mathematical or even scientific concepts. They are best approached by examples and by moving from clear and indisputable examples to more complex, grey-shaded ones. They are also approached by what Gilbert Ryle used to term conceptual cartography; one understands one concept by drawing out a map that conveys its relations to other, similar concepts. Understanding trust requires exploring its relations to concepts like responsibility and hope. Trust is a kind of sensitivity or responsiveness that arises in social relations; thus, it is a mode of responsibility. And trust is ignited, sustained, and restored through hope; when disrupted by wrongdoing and betrayal it can be restored by forgiveness. So our accounting of trust will touch on its relations to these related moral concepts.

1. Trust is reliance on responsibility
Trust has a central or core meaning that Urban-Walker characterizes as "reliance on responsibility." I rely on others to behave responsibly in everyday social interactions; I also understand that they rely on me to behave responsibly. This is close to Solomon's formulation of trust as the expectation of ethically justifiable conduct from others. But Urban-Walker inserts trust into the everyday moral relations and interconnections created by responsibility. As we will see below, trust is best understood by spelling out the context in which it functions where individuals interacting with one another, stand vulnerable to each other, and rely on one another to carry out the duties and projects of their lives.

2. Trust makes us vulnerable and dependent on the good will of others
Trudy Grover (as summarized by Urban-Walker) identifies several characteristics of operative trust (MR 79): (a)"expectation of benign behavior based on beliefs about a person's motivation and competence;" (b) "an attribution of general integrity;" (c) "an acceptance of risk and vulnerability;" (d) a "disposition to interpret the trusted person's actions favorably." This list conveys the idea that trust makes us vulnerable to the actions of others while it makes them vulnerable to our actions. Trust, others words, arises only when we risk betrayal.

3. Trust requires taking up the "participant attitude."
Trust takes place within what the philosopher Strawson terms the **"participant attitude"** or participant standpoint. This standpoint is accompanied by reactive attitudes; should others fail to do what is expected of them or fall short of commonly accepted moral standards, then we respond with "reactive attitudes" like resentment and indignation. In fact, trust functions through a whole series of responsive emotions such as pride, shame, resentment, indignation, and hope. (MR 79) When we take up the participant standpoint, we become involved in the world and its interrelations and transactions. Opposed to this is what Strawson terms the **objective attitude** where these intentional and self-directed emotions do not apply because the agent, for some reason, fails to become involved in social and moral relations. Part of what it means to be moral is to be subject to these reactive attitudes as well as being able to direct them responsively toward others. Psychosis is defined as being unable to exercise reactive attitudes; one doesn't feel resentment or indignation or feels them inappropriately. Thus, trust must be understood as functioning within the participatory standpoint, that is, within a network of social and moral interdependencies and transactions.

4. There are several factors that motivate or encourage the development of trust.

- Urban-Walker presents motives that foster and maintain trust. She takes these from Pettit (MR 76-77). Thus, trust is motivated by…
- working to "keep the good opinion that my trust already displays"
- a "concern for reputation"
- "in pursuit of reciprocity"
- "out of fear of penalties for poor performance"
- "out of an impersonal sense of obligation" (76-77)

5. Trust, hope,and forgiveness.
Trust (and restoration of trust) is closely related to other attitudes such as hope and forgiveness. Hope (its futurity, desirability, possibility, and dynamic tendencies) opens one to responsive action in the future. Hope maintains trust and can even restore it when wrongdoing has undermined its proper functioning.

6. Ways of bulding trust.
The chart below also presents different strategies for creating and preserving trust as presented by psychologist, Steven Pinker. In his book, **The Better Angels of Our Nature**, Pinker provides a sustained argument that evil and violence have gradually diminished throughout the history of human kind. This decline is caused by an increase in trust in much the same way that cooperation places Prisoner Dilemma iterations on target toward the common good. Think about how the Pacifist's Dilemma, Leviathan,Commerce, Femiknization, and Cosmopolitianism and Reason can be modelled in the context of the Prisoner's Dilemma. (See below)

Trust Table

Core Meaning or Root Metaphor(1,1)	Description(1,2)	Features(1,3)	Exercises in Trust (Steven Pinker: The Better Angels of our Nature(1,4)	Cases and Examples(1,5)
The expectation of moral conduct on the part of others (Solomon)(2,1)	Urban-Walker: "Trust, in several varieties, is an attitude of reliance on others that holds those others responsible for the performance on which we rely" 27(2,2)	Attributes from Trudy Grovier summarized by Urban-Walker: (a) "expectation of benign behavior based on beliefs about a person's motivation and competence;" (b) "an attribution of general integrity;" (c) "an acceptance of risk and vulnerability;" (d) "disposition to interpret the trusted person's actions favorably;" 79(2,3)	**Pacifist's Dilemma**: "Common good dictates a strategy of peace. But individually, aggression is the best choice to protect against being the victim of aggression oneself."(2,4)	Death and the Maiden (Dorfman): a woman victimized under a South American dictatorship, has a chance to confront the man she believes raped her during the dictatorship. (2,5)
Urban-Walker: "I propose, then, that we think of interpersonal trust generically as a kind of reliance on others whom we expect (perhaps only implicitly or unreflectively) to behave as	"expectation of others for recognition of shared moral standards" and their "responsiveness to those standards and support of the practices that express and enforce them" 28(3,2)	(3,3)	**Leviathan**: "The Leviathan (power, state, authority) is charged with maintaining peace by being endowed with the authority and power to punish the aggressor. by overawing potential aggressors and self-serving human nature, the	**House of Games**: A confidence man, Mike, explains how he gains the trust of the mark by seeming first to give his own trust.(3,5)

relied upon...and to behave that way in the awareness...that they are liable to be held responsible." 78(3,1)			Leviathan creates an additional external incentive that pushes potentially warring parties toward peace." (3,4)	
Expectation of others to perform as relied upon(4,1)	Karen Jones: "trust is an affective attitude of optimism about the good will and competence of another in the domain of our interaction that creates an expectation that the other will be moved 'directly and favorably the thought that we are counting on her" 75(4,2)	Motives engendering trust from Pettit as summarized by Urban-Walker: "(a) "keep the good opinion that my trust already displays" (b) "one may also be responsive to trust out of concern for reputation" (c) "in pursuit of reciprocity" (d) "out of fear of penalties for poor performance" (e) "out of an impersonal sense of obligation"(4,3)	**Commerce**: "Commerce, working through markets of exchange of goods, makes collaboration and peace mutually advantageous. The invisible hand of the market place steers our aggressions toward the common good." The market properly aligns incentives.(4,4)	**Classroom Behavior**: (a) The classroom consists of relations of trust where we rely on one another to live up to standards of academic honesty. (b) Failure triggers participant reactive attitudes like resentment and indignation. (4,5)
The participant attitude toward reliance in which I am prepared to hold you responsible for doing what I assume you should do 80(5,1)	Anette Baier: "Trust is accepted vulnerability in relying on the good will and competence of others to 'take care' of something the truster cares about." 76(5,2)	(5,3)	**Feminization**: "Replacing masculine virtues of honor and audacity with feminine ones of care and stewardship, we remove incentives to war."(5,4)	**Financial Crises**: Former Goldman Sach executive claims that GS called clients "Muppets" and would think nothing about unloading bad investments on those with less experience and financial savvy. (5,5)

Root Meaning: "reliance on responsibility" (from Urban-Walker) with a close connection to Strawson's participatory reactive attitudes such as resentment and indignation. (6,1)	(6,2)	"Focus of trust" (closely paraphrased from Urban-Walker): (a) description within trust relation of distinct actions (b) designation of a task (c) reference to roles characterized by "standard assumptions" (d) mutually understood expectations developed in an ongoing relation (e) reference to general or specific norms 80-1(6,3)	**Cosmopolitanism and Reason**: "Cosmopolitanism expands the circle of sympathy to a global reach while replacing warrior emotions and passions with reason. (See Kant's recommendations for a Perpetual Peace.)(6,4)	Given regulatory gaps (and costs) and the need for a broad participation of individuals in financial markets, can finance perform its function (moving money throughout an economy) without trust? (6,5)

Table Summarizing Features of Trust

Prisoner's Dilemma

Imagine that two patriotic spies, A and B, have just been captured by the enemy. Both are placed in separate interrogation cells and are being pressured to confess and provide details about their spying activities. A and B would like to coordinate their actions but the enemy has kept them apart to prevent this. In their malevolence they wish to pit A against B in order to get the desired information. To do this, they have set forth the following systems of motivations, i.e., punishments and rewards.

Options

1. If both A and B confess then A and B are put in jail for five years each. The net loss in this scenario is 10. This is the least desirable alternative from the collective standpoint.
2. If one (A or B) confesses while the other does not, the confessor is released immediately while the non-confessor gets seven years in prison. This is the self-interest maximizing option for the confessor and the worst possible option for the non-confessing prisoner. Loss for confessor: 0. Loss for non-confessor: 7. Net loss: 7
3. If both do not confess then after six months of half-hearted interrogation (most of this time is for processing the prisoners' release), both are set free for lack of evidence. While not maximizing self-interest (this lies in one confessing while the other remains silent) this does maximize overall welfare by producing a net loss of only 1.

Prisoner A / Prisoner B	Confess	Not-Confess
Confess	Both A and B confess. This is the worst option collectively considered. Net loss: 10	B confesses while A does not confess. B maximizes self-interest while A suffers maximum individual loss. Net loss: 7
Not-Confess	A confesses while B does not confess. A maximizes self-interest and B suffers maximum individual loss. Net loss: 7	Both A and B do not confess. 0.5 loss to each (second best individually) while collectively considered this is the best outcome. Net loss: 1

Summary Table

The Prisoner's Dilemma is designed to model the reality of corporate governance where the directors/owners of a corporation delegate responsibility for the corporation's operations to managers who are charged with pursuing, not their own interests, but those of their directors. The problem of corporate governance is how to institutionalize this cooperative arrangement. Can managers be left alone and trusted to pursue the best interests of the corporation? This is the position of stewardship theory. Or is it necessary to design a system of external controls and incentives (mostly punishments but some financial rewards) to keep the managers from diverting the operations of the corporation toward their exclusive, self-interests?

The latter approach is taken by agency theory. Here human nature precludes that managers will carry out the interests of directors unless externally motivated to do so. Naturally inclined to maximize self-interest, managers must be forced in the direction of director and owner interest through external incentives such as punishments and rewards (formulated in terms of incentives for producing results of value to the corporation as a whole).

The repeated iteration version of the Prisoner's Dilemma attempts to model this debate between agency theory and stewardship theory. If one holds that cooperation only arise through "tit for tat" strategies, then one advocates agency theory. If, on the other hand, one holds that repeated iterations build trust and give rise to altruistic activity, then one is more sympathetic to stewardship theory which holds that managers can set aside rational self-interest and act as stewards who represent or embody the interests of the owners.

The Prisoner's dilemma is discussed throughout the literature in business ethics. For a novel and insightful discussion in the context of corporate responsibility see Peter A. French, 1995 **Corporate Ethics** from Harcourt Brace College Publishers

What you are going to do

Exercise One

- Play the Prisoner's Dilemma game with one of your group members.
- Make sure you understand the options and the rewards and punishments associated with each. If you confess while your teammate does not confess, you get 0 points while your teammate loses 7. If you both confess, you each lose 5 points for a net loss of 10. If you both decide to not confess, then you each lose 0.5 points with a net loss of 1.
- Play only one round.
- Do not discuss what you are thinking with your teammate. Remember the enemy is keeping you separate to prevent collaboration.

Exercise Two

- This is the same as exercise one except you will play multiple rounds. Your teacher will not tell you how many rounds you are playing until you reach the last round.
- What is the difference between playing only one round and playing n rounds?
- Where are you more likely to compete or anticipate competing? When you are playing only one round, when you play several rounds and know in advance how many, or when you are playing an indefinite number of rounds and now find yourself on the last round?
- What can you do as a player to motivate your teammate to cooperate rather than compete? How should you respond when your teammate decides to cooperate and not confess? How should you respond in future rounds after your teammate confesses?

Exercise Three

- a. The following are claims as to the assumptions made by the prisoner's dilemma. Evaluate each.
- Cooperation produces the best collective option and the second best individual option. This, in turn, assumes that cooperation produces more social welfare than competition.
- Free riding (competing) on the cooperation of others produces the most individual gain (for the free rider) but the second worst collective results. Society suffers loses from the harm done to the trusting, non-confessor and from the overall loss of trust caused by unpunished free-riding.
- Unlimited, pure competition (both prisoners confess) produces the worst collective results and the second worst individual results.
- Multiple iterations of the prisoner's dilemma eventually lead to cooperative behavior. But what causes this? (1) The trust that emerges as the prisoners, through repeated iterations, come to rely on one another? Or (2) the fear of "tit-for-tat" responses, i.e., punishing free riding by responding in kind on future iterations?
- b. Is the Prisoner's Dilemma neutral regarding human nature or does it assume Homo Economicus, namely, that each player is a socially atomistic, rational, self-interest maximizer?

Exercise Four

- Agency theory assumes that cooperation is the best collective strategy but cannot be achieved by relying solely on human nature. This is because agency theory is based on Homo Economicus which holds that each human individual is a self-interest maximizer and is ontologically separate from other individuals and society. In other words, human individuals will seek to maximize self interest unless there are external constraints and incentives that force them toward what is best collectively. The best strategy for corporate governance under this approach is compliance. One identifies rules, monitors conduct, and punishes non-compliance.
- Opposed to agency theory is stewardship theory. While acknowledging that humans are strongly motivated by self interest, they are also equally capable of altruistic, other-oriented behavior. Hence what is required is an integrity approach to corporate governance that works to strengthen altruistic impulses through the development and fostering of trust.
- Write a short essay (or hold a discussion within your group) as to which approach is best. What is the underlying approach to human nature that each assumes. What are the strengths and drawbacks to each approach? Which approach is best supported by what you have learned from playing the Prisoner's Dilemma?

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Capability Approach
(Caution! This module is a preliminary draft and is under development. This preliminary version is being published to test in ADMI 4016 and INTD 6095 during the Fall semester, 2013) This module has been developed to introduce graduate and undergraduate students to the Capability or Human Development Approach. It is currently being used at the University of Puerto Rico at Mayaguez in undergraduate classes in the "Environments of the Organization" and graduate classes in a new course developed as part of the GREAT IDEA grant called "Responsible Research in Appropriate Technology." Students will have a chance to view the capability approach through major exponents like Martha Nussbaum, Amartya Sen, and Ingrid Robeyns. GREAT IDEA stands for Graduate Research and Education for Appropriate Technology: Inspiring Direct Engagement and Agency and is being funded by the National Science Foundation.

I. Introduction

Case 1 from Women and Development (Nussbaum)
Vasanti was compelled to marry at a young age. In her caste, women are generally treated as property; she went from being the property of the family in which she was raised to the being property owned by the family of her husband. Like any other piece of property, her husband, her owner, was free to dispose of her as he saw fit. He beat her, forced her to work, and took the wages she earned and spent them on his leisure and on alcohol. In order to fund his drinking, he had a vasectomy for which he received payment from the government. This ensured that he and Vasanti would not have children, something she wanted for her emotional fulfillment and for her security.

Does Vasanti have enough to live a life compatible with human dignity? If not, what does she lack?

Case 2 from Women and Development (Nussbaum)
Jayamma carried bricks for a living in order to support her family. although her work was harder than that performed by men, she was paid less than them. When she became too old to continue with this arduous labor, she

applied for relief. The Indian government denied her this support because she had sons who were able to support her. But her sons refused to do so, and her daughter, a registered nurse who was willing to support her, could not because she could not pay the bribes necessary to buy her a job at the local hospital.

Does Jayamma have enough to live a life compatible with human dignity? If not, what does she lack?

II. Overview

Technologies need to be evaluated within the context of human projects, communities, and activities. In particular, they should be evaluated in terms of whether they promote or frustrate a life of dignity that can be spelled out in terms of substantial freedoms that Amaryta Sen and Martha Nussbaum term capabilities.

Nussbaum and Sen characterize capabilities as "'substantial freedoms,' a set of (causally interrelated) opportunities to choose and act. [T]hey are not just abilities residing inside a person but also freedoms or opportunities created by a combination of personal abilities and the political, social, and economic environment."

Sen and Nussbaum argue that a given capability, say bodily health, can be realized in different ways. The specific way a capability is realized is called its functioning. Resources (personal, social, and natural) that help turn capabilities into functionings are called conversion factors. A bicycle is a physical conversion factor that, under favorable conditions such as roads with decent surfaces, can turn the capability of bodily integrity into movement from home to work.

The Capabilities Approach changes the way we view developing communities and their members, replacing the view of developing communities as beset with needs and deficiencies with the view that they are repositories of valuable capabilities. Humans should strive to shape and reshape the surrounding socio-technical system to bring about the exercise

and expression of fundamental human capacities. According to Nussbaum, capabilities answer the question, "What is this person able to do or be?"

The Capabilities Approach, thus, adds depth to appropriate technology by providing criteria for choice; a technology derives its "appropriateness" from how it resonates with basic human capabilities and more specifically by whether it provides "conversion factors" that transforms basic capabilities into active functionings.

Amartya Sen declines to provide a definitive list of capabilities, arguing that this list varies according to context. Nussbaum, by interviewing different women's groups and especially by studying the plight of women in India, developed a list of capabilities and has made different modifications from time to time. She provides this list in several works. "Capabilities and Human Rights" provides an early version. Subsequent versions found in Women and Development, Upheavals of Thought, Frontiers in Justice, and Creating Capabilities provide the same list but with more detail and differences in emphasis. (For example, Nussbaum, based on her study of the situation of abused women in India, argues that property rights are essential and includes these in her discussion of the capability "Control Over One's Environment." Nobel Prize winning economist, Amartya Sen, originated the Capability Approach and has developed it through many publications; he gives a particularly illuminating account in Development as Freedom referenced below. Finally, Ingrid Robeyns summarizes much of the literature in two articles, a Stanford Encyclopedia of Philosophy article on the Capability Approach, which has been updated frequently, and a widely-sourced paper in the Journal of Human Development, "The Capability Approach: a theoretical survey." A particularly important addition made by Robeyns is her discussion of "conversion factors" that help turn capabilities into functionings.

III. Precursors to the Capability or Human Development Approach

Aristotle

- Nussbaum mentions three precursors of the Capability Approach, Aristotle, Marx, and Smith.
- In the Nicomachean Ethics, Aristotle argues that practical reason (phronesis) makes humans unique among living things and among animals. Practical reason is not just added to other attributes that humans share with living things such as life, growth, reproduction, self-propelled movement, and perception/sensation; rather practical permeates each of these attributes that humans share with other beings to make these attributes peculiarly human.
- Aristotle, at the beginning of the Politics, also poses the classical conception of the human being as a social animal, a being that forms communities. Aristotle social conception of the human differs fundamentally with the prevalent economic view, Homo Economicus. According to Ghoshal, Homo Economicus characterizes humans as "rational self-interest maximizers. Human studies under Homo Economicus argues that social collectives must be reduced to the isolated, independent human beings that form their parts. This methodological individuals entails ontological atomism; as opposed to Aristotle's conception of the human as the "social animal," Homo Economicus sees humans as determinate and complete prior to and independently of any social relationships.
- The distinction between capability and function closely parallels the Aristotlian distinction between potentiality (dynamis) and actuality (energia); capabilities capture what humans are potentially and functionings capture the specific and unique way capabilities are realized by specific individuals in unique situations. Using a list of capabilities to outline human nature in its potentiality helps to set the minimal thresholds that must be met in order for humans to live lives of dignity without overly specifying or determining how individual turn these capabilities into functionings. In this way, capabilities represent different realms of freedom or choice.
- Finally, Aristotle outlines basic features that set boundaries to human being; humans are vulnerable (in that conditions can arise which prevent humans from realizing their potentialities) and mortal.

Smith

- Smith anticipates many of the fundamental theses of the capability approach. First, he agrees with Aristotle that humans are bounded by their mortality and vulnerability.
- Second, Smith agrees with the notion that the human is a social animal, contrary to the many individualistic interpretations that have been foisted upon him.
- Finally, Smith's conception of human vulnerability led him to pose many governmental and social interventions to allow humans to act freely and humanly: the abolition of apprenticeship, laws against monopolies, restrictions on businesses lobbying government, and the abolition of slave trade.
- Contemporary interpretations of Smith incorrectly view him through the lens of Social Darwinism; they interpret Smith as advocating competition to bring about the survival of those who are socially the fittest. Since Smith wrote and lived before Darwin published his theory of evolution, this interpretation foists upon Smith views that he never held and would have rejected.

Marx

Marx, through his conception of the alienation of a human individual from his or her labor, updates Aristotle's notion that practical reason transforms those characteristics that humans share with other living beings. Nussbaum offers the following quote from Marx as evidence: **"It is obvious that the human eye gratifies itself in a way different from the crude, non-human eye; the human ear different from the crude ear, etc…The sense caught up in crude practical need has only a restricted sense. For the starving man, it is not the human form of food that exists, but only its abstract being as food; it could just as well be there in its crudest form, and it would be impossible to say wherein this feeding activity differs from that of animals."** (Karl Marx, Econnomic and philosophical Manuscripts of 1844, translated by Martin Milligan, in R.C. Tucker (ed), The Marx-Engels Reader, New York, 1978: 88-89. Quoted in Nussbaum, Human Nature, 119.)

IV. Capability Approach—Some Key Concepts:

This list of the central concepts of the Capability Approach is taken primarily from Nussbaum's Creating Capabilities to get the latest developments of this movement. Some terms have been taken from Robeyns and others from Oosterlaken.

- **Capability Approach**: "The Capabilities Approach can be provisionally defined as an approach to comparative quality-of-life assessment and to theorizing about basic social justice. It holds that the key question to ask, when comparing societies and assessing them for their basic decency or justice is, "What is each person able to do and to be?" Nussbaum, Creating Capabilities,(18)
- **Capabilities**: "What are capabilities? They are the answers to the question, "What is this person able to do and to be? In other words, they are what Sen calls "substantial freedoms," a set of (usually interrelated) opportunities to choose and to act. Nussbaum, Creating Capabilities, 20.
- **Basic Capabilities**: "Basic capabilities are innate faculties of the person that make later development and training possible." Creating Capabilities, 24. An older definition comes from Human Rights in Theory": "the innate equipment of individuals that is the necessary basis for developing the more advanced capability. Most infants have from birth the basic capability for practical reason and imagination though they cannot exercise such functions without a lot more development and education." HRT: 289. Or, Women and Development (Nussbaum): 84: "the innate equipment of individuals that is the necessary basis for developing the more advanced capabilities, and a ground of moral concern.
- **Internal Capabilities**: "developed states of the person herself that are, so far as the person herself is concerned, sufficient conditions for the exercise of the requisite functions. Unlike basic capabilities, these states are mature conditions of readiness." WD: 84. And an earlier statement in HRT 289: "states of the person herself that are, so far as the person herself is concerned, sufficient conditions for the exercise of the requisite functions…[M]ost adult human beings everywhere have the internal capability to use speech and thought in accordance with their own conscience."

- **Combined Capabilities**: "Finally, therefore, there are combined capabilities, which may be defined as internal capabilities combined with suitable extrernal conditions for the exercise of the function." WD: 84-5. Or HFT: "internal capabilities combined with suitable external conditions for the exercise of the function. A woman who is not mutilated but is secluded and forbidden to leave the house has internal but not combined capabilities for sexual expression—and work, and political participation." HFT 289-290.
- **Functioning**: Nussbaum, CC: 24-5: "On the other side of capability is functioning. A functioning is an active realization of one or more capabilities. Functionings need not be especially active or, to use the term of one critic, "muscular." Enjoying good health is a functioning, as is lying peacefully in the grass. Functionings are beings and doings that are the outgrowths or realizations of capabilities."
- **Conversion Factor**: For Robeyns, conversion factors help convert a capability into a functioning. The example most often given is that of a bicycle which converts the capability of bodily movement into actually moving from one's home to one's place of work. But the bicycle only works as a conversion factor under certain conditions. Individuals must have the physical apparatus and stamina to actually ride the bicycle. And a bicycle would not work well in a desert where there were no roads. Robeyns points out that there are "three groups of conversion factors." "[P]ersonal conversion factors (e.g. metabolism, physical condition, sex, reading skills, intelligence) influence how a person can convert the characteristics of the commodity into a functioning….Second, social conversion factors (e.g. public policies, social norms, discriminating practices, gender roles, societal hierarchies, power relations) and, third, environmental conversion factors (e.g. climate, geographical location) play a role in the conversion from characteristics of the good to the individual functioning." Robeyns, "Capability Approach: a theoretical survey, Journal of Human Development, 6(1), 2005: 99.
- **Zooming in and Zooming out**: Ilse Oosterlaken uses these two ideas to bring the philosophy of technology into contact with the capability approach. "Zooming in…allows us to see the specific features or design details of technical artifacts; zooming out…allows us to see how exactly technical artifacts are embedded in broader socio-

technical networks and practices." 'Zooming in' cites participatory and value-sensitive design as ways in which moral value and import are integrated into a technical artifact's design. 'Zooming out' places the surrounding socio-technical context in the center of focus and concentrates on how a technical artifact is enrolled or integrated into this broader context. Technical artifacts, thus, are relational; the device must be understood in terms of how it functions in this broader socio-technical context. Zooming in and zooming out allow Oosterlaken to work around the dichotomy within the philosophy of technology between the social determination of technology and the technological determinism of society. Zooming in shows how value is designed into the artifact and how this works on the surrounding socio-technical environment. Zooming out shows how the technical artifact takes on meaning as it is 'enrolled' into a socio-technical system. (See Taking a Capability Approach to Technology and Its Design: A Philosophical Exploration, Introduction, 14. Simon Stevin Series in the Ethics of Technology). (See Taking a Critical Approach to Technology and Its Design 13 (table) and 14.)

- Mark Coeckelbergh in "How I learned to Love the Robot" looks at the importance of deploying **"techno-moral imagination"** in the exploration of the appropriateness of a technology for a given socio-technical system. (His example is the use of robots for care of the elderly.) As he puts it: "One way to proceed…is to study technological promises (research proposals, interviews in the media, and so on) and to write—not just read and discuss—fictional scenarios in order to imaginatively explore how future technologies could re-shape not only elderly care, but also our capabilities and their meaning." This resembles John Dewey's "dramatical rehearsals" where one imaginatively plays out a solution alternative or project in the mind in order to explore how readily it can be integrated into the real world. (Human Nature and Conduct and The Moral Life) Such experiments of imagination are described by John Gardner in Moral Fiction and actualized in many of his novels. (See especially The Sunshine Dialogues.) Mark Coeckelbergh, ""How I Learned to Love the robot": Capabilities, Information Technologies, and Elderly Care." in The Capability Approach, Technology and Design, Illse Oosterlaken and

Jeroen van den Hoven (eds). New York: Springer: 77-86.) Your first item here

V. Capabilities List

This next section quotes the Capabilities List given by Nussbaum in Women and Development, Frontiers of Justice, and Creating Capabilities. This list is taken from Creating Capabilities.

1. **Life**. Being able to live to the end of a human life of normal length; not dying prematurely, or before one's life is so reduced as to be not worth living.
2. **Bodily health**. Being able to have good health, including reproductive health; to be adequately nourished ; to have adequate shelter.
3. **Bodily integrity**. Being able to move freely from place to place to be secure against violent assault, including sexual assault and domestic violence; having opportunities for sexual satisfaction and for choice in matters of reproduction.
4. **Senses, imagination, and thought**. Being able to use the senses, to imagine, think, and reason—and to do these things in a "truly human" way, a way informed and cultivated by an adequate education including, but by no means limited to, literacy and the basic mathematical and scientific training. Being able to use imagination and thought in connection with experiencing and producing works and events of one's own choice, religious, literary, musical, and so forth. Being able to use one's mind in ways protected by guarantees of freedom of expression with respect to both political and artistic speech, and freedom of religious exercise. Being able to have pleasurable experiences and to avoid nonbeneficial pain.
5. **Emotions**. Being able to have attachments to things and people outside ourselves; to love those who love, and care for us, to grieve at their absence; in general, to love, to grieve, to experience longing, gratitude, and justified anger. Not having one's emotional development blighted by fear and anxiety. (Supporting this capability means supporting forms of human association that can be shown to be crucial in their development.)

6. **Practical Reason**. Being able to forma a conception of the good and to engage in critical reflection about the planning of one's life. (This entails protection for the liberty of conscience and religious observance.)
7. **Affiliation**. (A) Being able to live with and toward others, to recognize and show concern for other human beings, to engage in various forms of social interaction; to be able to imagine the situation of another. (Protecting this capability means protecting institutions that constitute and nourish such forms of affiliation, and also protecting the freedom of assembly and political speech.) (B) Having the social bases of self-respect and nonhumilitation;' being able to be treated as a dignified being whose worth is equal to that of others. This entails provisions of nondiscrimination on the basis of race, sex, sexual orientation, ethnicity, caste, religion, national origin.
8. **Other species**. Being able to live with concern for and in relation to animals, plants, and the world of nature.
9. **Play**. Being able to laugh, to play, to enjoy recreational activities.
10. **Control over one's environment**. (A) Political. Being able to participate effectively in political choices that govern one's life; having the right of political participation, protections of free speech and association. (B) Material. Being able to hold property (both land and movable goods), and having property rights on an equal basis with others; having the right to seek employment on an equal basis with others; having the freedom from unwarranted search and seizure. In work, being able to work as a human being, exercising practical reason and entering into meaningful relationships of mutual recognition with other workers. Your first item here

VI. Two Aristotelian Notions

- Practical reason infuses all the activities or functions humans share with other things. Thus Aristotle argues that living, eating, growing, reproducing, and perceiving—activities shared with other beings—are made peculiarly human by being integrated throughout with practical reason (phronesis).
- Sociability and responsiveness refer to the Aristotelian doctrine that the human is the political animal. This means that it is in the nature of

humans to make and live within social communities referred to by the Greek word, polis. Translating 'polis' as city state is as good as any translation but the terms city and state refer to entities that did not exist separately in Aristotle's Greece. The polis is a self-governing community that provides an environment where humans realize key potentialities (such as affiliation, emotion, and sense/imagination/thought). This doctrine is opposed to the radical individualism of Hobbes and Locke referred by MacPearson as "possessive individualism." (It is also opposed to Homo Economicus as described by Ghoshal and discussed briefly above.)

VII. Limitations of Utilitarianism from the Capabilities Approach Perspective

- "[U]tilitarianism tends to think of the social total, or average, as an aggregate, neglecting the salience of the boundaries between individual lives."
- "A second problem with utilitarianism is its commitment to the commensurability of value, the concern to measure the good in terms of a single metric and thus to deny that there are irreducibly plural goods that figure in a human life."
- Preferences, especially those forming the basis of preference utilitarianism, are notoriously subject to deformation that comes about when those deprived of preference satisfactions adjust their desires accordingly lower to meet what is possible.
- (These objections to utilitarianism are set forth in HTR, 281-282.)

VIII. Human Capabilities and Human Rights

- Rights are combined capabilities. These are "internal capabilities combined with suitable external conditions for the exercise of the function." 290 This sense of rights does not capture all senses but those versions which emphasize the correlativity of rights and duties do a good job of spelling out those individuals and social conditions that are necessary for the full exercise of a human right.

- "Rights can be prior to capabilities and a ground for the securing of a capability." This claims assumes that a right is an "untrained power… that demands or calls for support from the world." These powers generally sort out into two: "moral reasoning" and "power of moral choice." So exercising a right assumes a certain set of capabilities like sense/imagination/thought, practical reasoning, and affiliation.
- Nussbaum also talks of rights as if they were basic and combined capabilities. This emphasis material rights to resources or utilities.
- Finally, Nussbaum points out certain important functions carried out by rights language (296). They "remind us that people have justified and urgent claims." A right "tells people…that we are dealing with an especially urgent set of functions" that belongs to "all humans by virtue of their being human." Rights language "emphasizes people's choice and autonomy." Finally, "Rights talk preserves a sense of the terrain of agreement."
- These quotations are taken from Martha Nussbaum's article, "Capabilities and Human Rights." Martha C. Nussbaum, Capabilities and Human Rights, 66 Fordham L. Rev. 273 (1997). Available at: http://ir.lawnet.fordham.edu/flr/vol66/iss2/2

IX. What you are going to do

Exercise One
Identify the capabilities realized by the following technical artifacts:

- Podcasting technology used in Zimbabwe to provide farmers information about cattle.
- The XO Laptops distributed to school children in the Global South as a part of the One Laptop Per Child program.
- The redesigning of airplane cockpits around specifications that fit better the requirements of women as pilots.
- The redesigned and implemented irrigation project implemented in India described by the "people's choice" article.
- Automobiles as used by Amish communities in the US Midwest.

Exercise Two

Fundamental question posed by Nussbaum on a human life: **For the best and deepest of the metaphysical arguments brought forward seem to contain an evaluative component: that is, they ask us (implicitly or explicitly) to consider which functions of an alleged human being are so important, so central, that their absence will mean the absence of a human being or human life." ("Aristotle on human nature and the foundations of ethics" 94)**

- Capabilities emphasize practical reason and human sociability and responsiveness.
- Nussbaum in "Aristotle on Human Nature" talks about how both Greek philosophy and drama carry out thought experiments that invite readers and audiences to ponder about the boarders of human being.
- Specifically, humans are contrasted with gods who lack mortality and vulnerability. Plato and Aristotle both argue that a life without these two defining limits cannot be considered or conceived as human.
- Aristotle also sets forth practical reason as a capability that enters into all the other characteristics that humans share with other living things, transforming these functionings into human functionings; e.g. humans eat but they eat in a peculiarly human manner.
- Finally, humans are political animals; this refers to both sociability and responsiveness (to other human individuals).
- Putting these concepts discuss the following in terms of what they share and do not share with humans. (Examples are taken from the Lord of the Rings.)

1. **Orcs and goblins**. Orcs were bred from Elves in a process that clearly implies a degradation of the elf. How would orcs and goblins compare with Cyclops, Minotaurs, and other beings classified in Greek literature as beasts lacking fundamental human attributes. What would these attributes be? Are there, for example, distinctions to be made between the pleasures of a human and, say, those of a beast?
2. **Hobbits**. Are Hobbits human in the Greek sense? (What characteristics do they share with humans? Are there any significant, boundary characteristics lacking? Are they more or higher than human in some sense(s)?)

3. **Elves (and dwarves)**. Both are immortal (or, in the case of dwarves, live much longer than humans). Nevertheless, both are vulnerable; e.g. both can be killed in battle. How would these differences serve to distinguish what was a fulfilling for these beings versus human beings?
4. **Wizards**. Wizards can change shape and possess magical powers. At least the movie implies that they come from beyond the earth. They are immortal but vulnerable. (Gandalf went through a death of sorts in his fight with the Balrog.) Discuss how this mode of being would be different from that of humans.

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Responsible Choice for Appropriate Technology
This module explores cases studies of responsible choice of appropriate technologies for a variety of communities including communities in developing nations. This first version is incomplete and is being published to gain further reaction from students and faculty. It has been prepared in conjunction with the University of Puerto Rico at Mayaguez NSF project, GREAT IDEA.

I. Introduction

The goal of this module is to help you to think about technology in a different way. We tend to think of technologies as value-neutral tools not good by themselves but only in terms of the uses we put them to. The moral value of the hammer depends on the user and use. It can push nails into wood to build a house or hit someone on the head expressing unjustified anger and aggression against another.

But technologies are more than just value neutral tools. They are enacted in different worlds characterized by our activities, projects, institutions, cultures, and physical environments. At times they become extensions of our hands and feet and are called prosthetics. At other times, when they fail to fulfill the functions we have assigned them, they become obstacles that thwart or oppose our desires. (In the hands of the carpenter, the hammer pounds nails quickly and flawlessly into roof tile while the inexperienced home improver finds it a clumsy tool that bends nails.) Wanda Orlikowski encourages us to think of technologies less as external objects and more as enactments. She presents a case study that shows how a word processing program takes on four very different value colorings as it is enacted in each of four different socio-technical systems. This module is designed to help you to visualize how technologies that shape, magnify, extend, and constrain human activity. (See Orlikowski below.)

Some other goals
In this module you will...

- examine cases where a community exercises technological choice

- practice socio-technical sensitivity by describing the socio-technical system that underlies your group's case
- learn frameworks that guide the choice of appropriate technology
- develop an active understanding of how technologies form one environment alongside other environments that shape, enable, magnify, circumscribe, and constrain human action

II. What you need to know.

Responsibility in the context of technological choice.
Herbert Fingarette in the Meaning of Criminal Insanity (see below) characterizes moral responsibility as (moral) response to (moral) relevance. This means responsibility is a skill that combines two components. First one exercises techno-social sensitivity to uncover those aspects of a situation that have moral relevance. To a person sitting on a crowded bus, of all the things going on, the fact that an older man is awkwardly standing, uncomfortable and holding several boxes, is morally relevant. Picking this out of a complex situation draws upon a sophisticated set of emotional, cognitive, and perceptual skills. Second, having focused on what is morally relevant in a situation, a responsible agent then sets about devising action that is responsive to this relevance. The individual on the crowded bus, in response to the relevance of the man awkwardly standing, stands up and offers him a seat. Socio-technical System description and analysis provide a formal way of uncovering moral relevance in a concrete situation. This module will give you an opportunity to practice this skill. The value realization framework laid out in this module(see Flanagan, Howe, and Nissenbaum below), provides a structure for using value realization as a response to relevance. This part of the module will get you thinking about how to develop value realizing actions that respond to the relevance uncovered in STS description. See Harris below for a description of techno-socio sensitivity that falls in nicely with the account of moral responsibility as response to relevance.

Understanding appropriate technological choice requires that you learn a basic vocabulary. This section presents short, informal descriptions of "appropriate," "technology," "capability," "social construction of

technology," and "technological determinism." At the end, you will find a media file for a Jeopardy to help you learn these terms.

Technology
Technology: As was said in the previous section, a technology is more than just a physical object. It is a device activated within a network of social relations called a socio-technical system. (See below for more on socio-technical systems or STSs.) Technologies are much more than value neutral tools; a technological object or artifact can become an extension of the human body, a prosthesis, that magnifies, focuses, intensifies, shapes, channels, and constrains human actions and activities. Taken by themselves they are incomplete and indeterminate; enacted within a socio-technical system, they accomplish human activities.

Socio-Technical System
Socio-technical System. Determining whether a technology is appropriate requires close attention to the socio-technical background which forms a system, a "complex environment of interacting components, together with the networks of relationships among them." According to Huff, a socio-technical system is "an intellectual tool to help us recognize patterns in the way technology is used and produced." For example, Huff has his computing students write "Social Impact Statements" to outline the impact a computing technology would have on the socio-technical system (STS) in which it is being integrated. Students triangulate their impact claims through day-in-the-life scenarios, participatory observation, and surveys; any claim made on the impact of a technology has to be substantiated through three different methods of observation (in private conversations).

Socio-technical systems, thus, exhibit several characteristics.

- STS analysis helps us understand how occupational and professional practice is shaped and constrained by different surrounding environments.
- Socio-technical systems are first and foremost systems. While they are composed of discrete parts, these are embedded in a network of relations and interact with one another. Hence, STS description requires systemic or ecological thinking; a STS must be approached as a whole which is not reducible to the sum of its parts

- The different components of a STS can include hardware, software, physical surroundings, people/groups/roles, procedures, laws/statutes/regulations, and information systems. This list of distinguishable components varies according to context and purpose. These distinguishable components are, nevertheless, inseparable from one another. Repeating the previous point, *STSs are, first and foremost, systems*.
- STSs *embody or embed values*. This makes it possible to prepare Social Impact Statements that identify and locate embedded values, chart out potential conflicts, and recommend system adjustments to remediate these. STS analysis, thus, adds a dimension to the determination of the appropriateness of a given technology by raising the question of whether its incorporation into a specific STS leads to value conflicts or resolves value vulnerabilities.
- STSs *change* due to internal value issues as well as issues stemming from their interactions with other STSs. STS changes are directional in that they trace out trajectories or paths of change. Thus, another test of appropriate technology is whether its integration into a STS places that system on a *positive or negative trajectory of change*.
- To repeat a point made just above, STS analysis employs *systems or ecological thinking*. Just as important as the properties of the parts that compose a socio-technical system are the relations between these parts and the ways in which they interact. These relations and interactions give rise to properties that STSs as wholes display but which cannot be found when analyzing the constituent parts in isolation from one another. Another way of putting this is that STSs require holistic think that is markedly different from what sociologists call "methodological individualism."
- Werhane et al. in Alleviating Poverty provide an insightful account of systems and systems thinking. They see this as necessary in building and analyzing alliances between stakeholders devoted to diminishing poverty.

Appropriate Technology
Appropriate Technology. The term "appropriate technology" comes from economist E. F. Schumacher and plays a prominent role in his book, *Small Is Beautiful*. For Schumacher, an *appropriate* technology is an *intermediate*

technology which stands between the "indigenous technology of developing countries" and the "high capital intensive technology" of developed countries. Appropriate technology represents a step or a bridge that moves a community cautiously and continuously toward a developmental goal.

Thus, intermediate technology is *appropriate* in the sense that it reduces or eliminates the harmful impacts of moving too quickly from indigenous, labor intensive technology to high capital intensive technology. Technology that is appropriate to orderly, sustainable, and humane development …

- gives "special consideration…to context of use, including environmental, ethical, cultural, social, political, and economical aspects";
- seeks simplicity as opposed to (manifest or latent) complexity;
- chooses decentralization because it is more orderly, sustainable, and human than authoritarian centralization;
- employs labor intensive as opposed to capital intensive strategies;
- addresses itself to the unique characteristics of the surrounding community
- This description of appropriate technology quotes directly from Wikipedia and from Schumacher. See below.

Capabilities or Human Development Approach
The Capabilities or Human Development Approach: Technologies need to be evaluated within the context of human projects, communities, and activities. In particular, they should be evaluated in terms of whether they promote or frustrate a life of dignity that can be spelled out in terms of substantial freedoms that Amaryta Sen and Martha Nussbaum term *capabilities*. Sen and Nussbaum argue that a given capability, say bodily health, can be realized in different ways. The specific way a capability is realized is called its functioning. Resoures (personal, social, and natural) that help turn capabilities into functionings are called conversion factors. (A bicycle is a physical conversion factor that (under favorable conditions such as roads with decent surfaces) turn the capability of bodily integrity into movement from home to work.)

The Capabilities Approach changes the way we view developing communities and their members, replacing the view of developing

communities as beset with needs and deficiencies with the view that they are repositories of valuable capabilities. Humans should strive to shape and reshape the surrounding socio-technical system to bring about the exercise and expression of fundamental human capacities. According to Nussbaum, capabilities answer the question, "What is this person able to do or be?" Nussbaum and Sen characterize capabilities as "'substantial freedoms,' a set of (causally interrelated) opportunities to choose and act. [T]hey are not just abilities residing inside a person but also freedoms or opportunities created by a combination of personal abilities and the political, social, and economic environment." The Capabilities Approach, thus, adds depth to appropriate technology by providing criteria for choice; a technology derives its "appropriateness" from how it resonates with basic human capabilities and more specifically by whether it provides "conversion factors" that transforms basic capabilities into active functionings.

Nussbaum's List
Nussbaum discusses the capabilities approach in several works most notable of which are Frontiers in Justice and Creating Capabilities. Sen lays out his version in several publications. **Development as Freedom** is referenced below. Finally, Robeyns discusses conversion factors in an article in the Standford Encyclopedia referenced below.
Basic Capabilities

- **Life**
- **Bodily Health**
- **Bodily Integrity**
- These capabilities overlap with basic rights. But the capability approach moves beyond the rights perspective by exploring the social and community-based dimensions of human agency; rights on the other hand are more individualistic. (See Werhane on this.) Bodily Integrity would include, for example, freedom from marital rape and the ability to move about freely within one's own country.

Cognitive Capabilities

- **Sense, Imagination, Thought**
- **Emotion**
- **Practical Reason**

- **Note**: Nussbaum's description of cognitive experience is richer than that allowed through the concept of homo economicus (the economic human) avowed by economical theory. (Homo economicus is driven by a narrow view of rational self-interest.) Emotions incorporate judgment, and practical reason overlaps with the autonomous ability to formulate and carry out thoughtfully life plans. Imagination and sensation are not separate from the knowing and cognitive faculties as they are, say, for Kant but closely connected with these as they are in the ethical theory of Aristotle. Full exercise of thought, sensation, and imagination could occur in aesthetic expression or religious experience. We explore emotions imaginatively through literature, drama, and cinema.

Social or Out-Reaching Capabilties

- **affiliation**: This capability allows forming alliances with others such as friendships and collegial workplace relations. This would include the capability to form associations such as a church, an NGO, or a political interest group.
- **Other Species**: Here Nussbaum is setting forth the rudiments of an environmental ethics where nature as a whole and the individuals within nature place constraints on human action. But, rather than formulating this traditionally in terms of the extension of utilitarianism or deontology, Nussbaum sees our ability to commune with nature as a necessary constituent of a life of human dignity or human flourishing.

Agent-Based Capabilities

- **Control Over One's Environment**
- **Play**
- The capability of play is deformed by child labor. Adam Smith, for example, comes out strongly against child labor in his economic theory and advocates strong government intervention to protect this capability. Childhood labor prevents children from reaping the developmental and psychological benefits of play. This capability militates directly against the idea that play is isolated and does not contribute to the formation of other cognitive and practical abilities such as emotion, thought/sensation/imagination, or practical reason.

On the other hand control over one's environment works directly against such poverty traps as uninsurable risk, lack of working capital, non-workable property practices, etc. See Stephen Smith below.

Capabilities lists vary. Nussbaum allows that others have different lists and that hers will certainly be modified as time passes and conditions change. Insofar as a technology plays the role of a **conversion factor** that transforms a capability into a functioning, then it is—-in the humanistic sense of the term—-appropriate. On the other hand, insofar as it thwarts capabilities and suppresses their expression it fails the test of appropriateness. When business and engineering professionals take a Human Development approach to their work, they broaden the design process and the development of new products and services to include a close examination of how the proposed novelty can either encourage or diminish the conversion of capabilities into functionings.

An advantage of the Capabilities or Human Development Approach over other approaches such as social contract theories of justice lies in its ability to extend the umbrella of justice to cover three challenges that have traditionally been ignored:

1. The capabilities and ranges of action of humans operating under physical and cognitive disabilities
2. Human individuals who have been born and live in nations of poverty, economic inequality, political oppression, and demeaning work and social roles and stations. In her book, *Creating Capabilities*, Nussbaum profiles a woman who is abused by her alcoholic husband, works longs hours in a demeaning job and returns home to the domestic responsibilities of being the primary care-giver to a family of four.
3. Natural ecosystems as well as natural species including domesticated animals, wild animals, and the entities that populate the natural environment.

Social Construction of Technology
This branch of technology studies provides insight into how technologies are socially constructed. Pinch and Bijker provide a case history of how the current bicycle design emerged from a social process of construction. In an initial stage of "interpretive flexibility," users interacted with different

designs as they negotiated in public space whether bicycles were for leisure, racing, touring, basic transportation, or sporting activities. As design variations were set aside and user goals and interests focused, this stage of interpretive flexibility narrowed and closed. In the final stage, a dominating design emerges that serves as a black box. With interpretive flexibility a thing of the past, the black box, the dominant design, takes on the appearance of inevitably; it captures the meaning of bicycle that was earlier up for grabs. (Pinch and Bijker discuss social constructionism in their paper referenced below. This can be easily found in the Johnson and Wetmore anthology, Technology and Society. This account builds on their discussion of the process of social construction: interpretive flexibility, closing of interpretive flexibility, and technological black box.)

The paper "Manufacturing Gender in Commercial and Military Cockpit Design," argues that it was necessary to reopen the black box of airplane cockpit design to reveal its instantiation of gender bias. Women were unable to fly airplanes because airplanes were not designed to accommodate their arm and leg reach, physical strength, height, and weight. This gender bias could only be removed through the restoration of interpretive flexibility. The gender biased design of airplane cockpits had to be revealed as a contingency rather than as a necessity.

Interpretive flexibility relies on an imaginative attitude that Steven Winter terms "transperspectivity." Designers must first "unravel or trace back the strands by which our constructions weave our world together" then "imagine how the world might be constructed differently." The capabilities approach compliments social construction of technology in that it asks how background social conditions can be changed to facilitate the realization of capabilities. Instead of forcing women to conform to inappropriate cockpit design, we ask how cockpit design can be reworked to facilitate the realization of the capability of women to fly planes.

Technological Determinism
Technological Determinism is the opposite of social construction. Where the position of social construction argues that society constructs or determines technology, the position of technological determinism argues that technology constructs or determines the dominant forms of social

interaction. While Langdon Winner is not a technological determinist, he lays out a terminology that dramatizes how technologies can cease to function as tools and, instead, take on the role of centers of concentrated power that dictate social forms and relations. Technologies create their own imperatives, that is, they assert their requirements as needs that demand fulfillment if we are to continue their functioning. These technological imperatives create the need for reverse adaptations. Instead of our designing and modifying technologies to fit our needs (technologies serve us), we set aside our needs and adapt ourselves to serving the requirements of complex technologies (we serve technologies). Winner discusses the technological imperative and reverse adaptability in Autonomous Technology. Larry Hickman provides an excellent summary of Winner's approach in John Dewey's Pragmatic Technology.

Questions for assessing the appropriateness of a technology

1. *Does the technology in question play the role of a conversion factor that changes capabilities into active functionings?* (Conversion factors are a bit like resources or means and can be personal, social, or environmental: see Robeyns) Review the ten capabilities outlined by Nussbaum. Does the technology in question help to realize a capability in the STS of your case? Which one? How? On the other side, does the technology threaten to thwart the realization of a capability? Which one? How?
2. *Does the technology in question embrace simplicity and avoid (manifest or latent) complexity?* The more complex a technology, the harder it is to control. As technologies become more complex they take on lives of their own. So one way of approaching this question is to assess the complexity of technology in terms of the background STS. Manifest complexity lies in the complexity that is obvious. Latent complexity is a negative factor in the appropriateness of a technology because latent complexity can often lead to unpredictable breakdowns and accidents.
3. *Does the technology embody a decentralized approach to control, one that disperses control over many localized centers or does it telescope control in one, centralized powerful locale?* Amish communities do not reject electricity per se but refrain from hooking up to power grids maintained by large public utilities in part because of this issue. As a

general rule, a technology is more appropriate when it can be instantiated and managed through decentralized points of control rather than through large, bureaucratic, authoritarian centralized points of control and management. Windmills would be preferable on this criterion to nuclear reactors because the latter are subject to catastrophic failures; this requires the exercise of tight managerial controls better brought through centralized and concentrated points of control and management.

4. *Does the technology realize or protect values (or resolve value conflicts) in such a way as to put the STS on a value-positive trajectory?* This, more than any of the other criteria of technological choice, requires holistic thinking. Bringing a technology into a STS should require mutual adjustment. How will the STS have to be adjusted to incorporate the technology with the minimum number of value issues (value vulnerabilities or value conflicts)? Will these adjustments place the STS on a value-positive trajectory? On the other hand, how malleable is the technology? (This is something you have already begun to answer as you looked at the technology's complexity and centralization.) If malleable, it can be adopted to the surrounding STS. If not, then the problem of reverse adaptation arises.

5. *Does the technology provide for a just distribution of relevant costs and benefits? Technologies create benefits and costs.* Utilitarianism argues that the only relevant factor is the ratio of benefits to costs; if benefits are maximized and costs minimized, the utilitarianism enjoins that we adopt the technology. This criteria provides an important caveat; not must benefits be maximized and costs minimized but benefits and costs must be broadly and equitably distributed among the stakeholders. Net benefit maximization often stands side by side with massive inequities in the distribution of costs and benefits; everybody benefits from cheaper gas prices made possible by the refinery located near a lower class neighborhood. But those living next to the refinery bear the brunt of the costs if the gas is made cheap by sacrificing pollution controls.

III. What you are going to do.

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In this section, you will learn about five cases of technological choice. You and your group will be assigned a case and will carry out a series of exercise in relation to it. Specifically you will…

1. Learn about your case by reading the article on which it is based and discussing it with other members of your group.
2. Describe your technology: (a) Identify its key features; (b) Provide a history of its social construction; (c) Identify its competitors. (Think about the racing versus safety models of the early bicycle)
3. Prepare a socio-technical description of your case: (a) Identifies it major components. Start with hardware, software, physical surroundings, stakeholders, procedures, laws, and information systems. Add or subtract as required by the particularities of your STS. (b) Describe each component in detail (c) Provide a table that summarizes your description
4. Assess your case's technology using the questions on appropriate technological choice presented in the previous section
5. Draw conclusions about the instances of technological choice portrayed in your case. Is it appropriate or inappropriate? Explain your group's position.
6. Prepare a poster summarizing your group work and present it to the class
7. Listen carefully to the presentations of the other groups in your class

IV. Cases of Responsible Choice of Appropriate Technologies

A. Technological Choice in Amish Communities

- "Amish Technological Choice: Reinforcing Values and Building Commitments" by Jamison Wetmore
- How do the Amish choose and modify technology so that it is compatible with community values and supports community ways of life
- Values: Amish values are centered around the community's Orduung. In general, Amish evaluate technologies in terms of the values of humility, equality, simplicity, and community. (See Wetmore)

- Examples: (a) Using power tools with rechargeable batteries to work around the need to connect to Electric company power grids; (b) Refraining from plugging into the grid of public utilities; (c) Purchasing cars and phones but restricting ownership to the community and use to business purposes; (d) Negotiating accommodations on government regulations so as to minimize impacts on community values and ways of life. (Example of not delivering milk on Sundays); (e) Securing community and individual identity by drawing, through technological choice, contrasts with the outside, surrounding, English community.

B. Removing Gender Bias from Airplane Cockpit Design

- "Manufacturing Gender in Commercial and Military Cockpit Design" by Rachael Weber
- This case describes the process of changing the design of airplane cockpits to remove gender bias.
- Values: (a) gender parity and equality; (b) respect (recognizing capabilities of women and designing airplanes around these capabilities); (c) justice in the form of an equitable distribution of the role and the benefits and burdens attached to the role of airplane pilots
- Article describes changes in the STS: (a) Norms: how do changes in society's norms help facilitate the redesign of airplanes and the cockpits? (b) Laws: how did changes in laws and regulations help uncover the gender bias in designs and spur the development of new designs that removed this gender bias? (c) Markets: The initial reaction of airplane manufacturers and consumers was that this would make airplanes prohibitively expensive. What changes in the market or financial context averted this threat? (d) Architecture: How did changing the JPATS help to solve this problem?

C. Uchangi Dam
C. Honest Brokering in India

- "People's Science in Action: The Politics of Protest and Action" by Pradkhe
- Retired engineers working with NGOs in India help resolve a 14 year standoff between the Indian government and villagers in Chafawade

and Jeur. The engineers carried out detailed studies into the STS surrounding these villagers including land use mappings. They were able to formulate plans for a different irrigation system that had less impact on these communities but still delivered the basic functions of an irrigation project.

- Values: (a) Responsibility: Shift design responsibility from a bureaucratic government agency to local communities empowered by work with NGO engineers; (b) Justice: Develop and design an alternative irrigation project that bettered distributed harms and benefits of irrigation among all the stakeholders; (c) Community Solidarity: Use government challenge as an opportunity to discover community values and give these voice through locally organized resistance and value responsive engineering plans
- Technologies: (a) Replace single large scale dam with several smaller dams; (b) Relocate water storage sites away from Chafawade and Jeur; (c) Redistribute and spread both the benefits and harms associated with the Uchangi dam and irrigation project. (d)Reconstruct the stakeholder alliance to represent better the interests of small villages in this region of India

D. Rapunsel: Designing Value into Educational Software

- M. Flanagan, D. Howe, and H. Nissenbaum, "Embodying Values in Technology: Theory and Practice," in *Information Technology and Moral Philosophy*, Jeroen van den Hoven & John Weckert, Eds. Cambridge, UK: Cambridge University Press, 2008, pp. 322-353.

- Educators in software development notice that there is a shortage of women programmers. Further investigation reveals that part of the problem is the gender bias inherent in software development including pedagogical materials (educational software) that is biased toward male and against female students. Educational specialists develop new educational software called Rapunsel that is geared toward computer programming to girls. Developers enact a value realization process that includes the discover of key values, their translation of these values into a design prototype that operationalizes and implements these

values in software, and a rigorous process to verify that the design in question actually realizes these values.

- Framework: (a) Discover by examining project definition, design features, designer values, user values including the values inherent in "subversive uses" (b) Translation that includes the operationalization of values in a design and their implementation in a concrete STS; (c) Verification brought about through the triangulation of methods of participatory observation that include questionnaires, interviews, and day-in-the-life-scenaios
- Values: (a) Project Definition: social and civil interaction, privacy, security, equity; (b) Design features: social and civil interaction, cooperativeness, fair and equitable representation; (c) Designer Values: diversity, distributive justice, gender equity; (d) User values: self-expression, authorship, collaboration
- Examples: (a) Educational software to teach girls computer programming; (b) Enacted in the form of a game environment; (c) Modified in light of participatory observation and "subversive uses"

E. One Laptop Per Child

- Kenneth L. Kraemer, Jason Dedrick, and Prakul Sharma. "One Laptop Per Child: Vision versus Reality." Communications of the ACM. June 2009, Vol. 52, No. 6: 66-73
- This case explores the challenges of implementing a laptop computer designed as an educational tool for children in developing nations. Laptops are chosen because, in the minds of the designers, they can deliver the tools of education in one convenient package. They present and create modes of interacting with educational software; they provide a convenient way of storing and displaying reading material and promise to replace traditional printed media; they create an environment where students can learn writing working through word processing media. And the innovation of the XO laptop is that it has been designed for use by children in areas that lack infrastructure for other, traditional educational media.
- Values: (a) Distributive Justice. XO laptops, because they are cheap and linked with sponsorship by developed world institutions, promise to reduce the digital divide by giving children (and their families) in

developing nations access to computers, the Internet, and all the information that the two can bring. (b) Realizing Capabilities. XO laptops can play the role of conversion factors transforming the following capabilities into functionings: Sense, imagination, and thought; Emotion; Practical Reason; Affiliation; Play

- Examples: (a) Fedora Linux Operating System; (b) WiFi access to Internet; (c) Hand cranks to recharge batteries. XO laptops are designed to operate in zones where there is no or insufficient electricity; (d) No drives. Relying on less sophisticated operating system software reduces the demand for storage capacity. (Given Internet access, many storage needs can be delegated to the Internet.) This further simplifies the system and makes it unnecessary to install a hard drive. (e) Designed for children. Hard, durable plastic casing and keyboards shaped for children's hands

F. Case for Waste for Life

- This case studies a press that produces building materials made from waste products and plant fibers.
- One chapter examines the integration of this technology into Lesotho.
- The other chapters look at the STS in Buenos Aires, Argentina and how it constrains the integration of similar technology there.
- This case study is available to UPRM students through the university's library. It is a part of the Morgan and Claypool series found in the section on electronic books.
- Complete Bibliographical Reference: C. Baillie, E. Feinblatt, T. Thamae, and E. Berrington. (2010). **Needs and Feasibility: A Guide for Engineers in Community Projects--The Case for Waste for Life**. Morgan and Claypool.

G. Aprovecho

- Aprovecho is a non-profit organization that specializes in stoves for developing nations.
- Respiratory disease from the pollution from stoves used indoors is a major cause of death for children under 5 years old in developing nations.

- Aprovecho is considering setting up a regional center for testing and distributing stoves in Puerto Rico.
- Are these stoves an appropriate technology for PR or even parts of PR?
- Be sure to listen to the NPR story on Aprovecho and the NPR series on Social Entrepreneurship
- Link given above: http://www.aprovecho.org/lab/index.php

V. Case Table

This table updates the technology choice cases used in this module.

Technology Choice Cases

Technology Choice Cases

	Description	Capabilities	Technology choice Issues	Puerto Rico Pivot(s)
One Laptop Per Child	Distributing laptops to school children in developing nations	Affiliation, play and practical reason	For or not for profit?	Laptops to PR public school children--Would it work?
Amish TC	How Amish use community values to choose and modify technologies	Emotion, affiliation, Thought Practical reason Control over env.	Not anti-tech; adopt and adapt using community values	Consider citizens of Vieques and whether they should allow windmill farms.
Gender Bias in Airplane Design	Redesigning airplane cockpits for women pilots	Control over one's environment	Going from women can't fly to planes are badly designed for women pilots	Are there designs in Puerto Rico that exhibit gender bias?
Bamboo	Using bamboo grown in PR as construction material	Other species, control over one's environment	Appropriateness and conversion of natural artifacts into technical	Creating a resource that is locally grown, harvested, and used
Biosand Filters in Haiti	Teaching people in Haiti how to use biosand filters to clean water	Health, bodily movement, affiliation	Using modern knowledge, simple artifacts, decentralization and other AT criteria	Lessons of community development and decentralization
Uchangi Dam	NGO engineers resolve a dispute between local communities and big government	Affiliation, bodily movement, control over env	NGO professionals as honest brokers in technological choice	Using values mapping to build local relevance into engineering designs
Aprovecho	Designing stoves to alleviate problems of indoor smoke and deforestation	Health, other species	Participation of local community in design of technical artifact	Listening to users and communities: an Inverse Peace Corps
Waste For Life	Using a hot press to recycle plastic in Argentina and Lesotho	Health, other species, cont. over env.	Same artifact, different STS, different results	The influence of surrounding environments on technical functioning

VI. Instructions for Poster Session

In this activity you will carry out the following tasks:

1. Read carefully the article that presents your case study in technological choice. Prepare an outline.
2. Prepare a poster that discusses your case in terms of the following framework.
3. **Zoom in**. Describe and classify the artifact that highlights your case. Give its physical structure, how it functions when it is working properly, and its "user manual."
4. **Zoom out**. Describe the socio-technical system that surrounds your artifact by constructing a table that outlines hardware, software, physical surroundings, people/groups/roles, procedures, laws, and information systems. Pay special attention to how the surrounding STS constrains and enables the functioning of your technical artifact.
5. **Discuss/Evaluate how "appropriate" your technical artifact is to its surrounding environment.** Is it "supportive of production by the masses," does it make use of the "best of modern knowledge and experience," does it trend toward "decentralization," does it fit in with the "laws of ecology," is it "gentle in the use of scarece resources," and does it serve human rather than constrain humans to serve it."
6. How does your technical artifact stand in relation to Nussbaum's list of **capabilities**? Most importantly, does it serve as a tool to address personal, social, and environmental conversion factors that help convert capabilities into functionings?

Close-out Writing Assignment

1. Choose a technical artifact from another group's poster. (Not the one prepared by your group.)
2. In one or two sentences, describe what is happening when the technology is fully functioning. This is called **"zooming in."**
3. Next, choose the two elements of the surrounding socio-technical system that most effect this technical artifact and its functioning. For example, the lack of electricity in communities in Zimbabwe have a strong impact on whether and how podcast broadcasts will take place.This focusing on the socio-technical system will help you to **"zoom out."**

4. Choose a capability from Nussbaum's list that is pertinent to the technical artifact you have chosen. Does this artifact serve as a conversion factor that converts the capability into a specific functioning? What personal or environmental factors could effect this conversion?
5. Formulate a test question (multiple choice format) that you think would arise from this group's poster and their technology choice case.
6. Zooming in and zooming out comes from Ilse Oosterlaken and can be found in **The Capability Approach, Technology and Design**, Ilse Oosterlaken and Jeroen van den Hoven, eds. New York: Springer, 2012.

VII. What have you learned?

- Technological choice is as much a skill as a set of concepts that you learn. This module has given you the opportunity to practice frameworks of technological choice in the context of real world cases. To help you capture what you have learned, reflect on the following questions:
- How does practicing technological choice help us to see technologies less as isolated objects and more as enactments?
- Using your case and the cases presented by the other groups in class in what sense and to what extent is the nature and structure of technology determined or constituted by social structure?
- Again, working with the cases studied in the module, under what conditions can technologies escape our control and, in turn, control us?
- What are the features and uses of a good, concrete STS description?

VIII. Jeopardy for Responsible Technological Choice

These exercises using the format of Jeopardy will help you learn the vocabulary of responsible technological choice. Click on the media file and download the Jeopardy as a PowerPoint. To play the game, simply put the PowerPoint in presentation mode. Several of the slides also have links to information slides that explain further the relation between question and answer.

Socio-Technical Systems in Incident at Morales
https://cnx.org/content/m43922/

More Jeopardy on Socio-Technical Systems
https://cnx.org/content/m43922/

Cases of Responsible Technological Choice
https://cnx.org/content/m43922/

Presentation: Training responsible agents for global contexts
https://cnx.org/content/m43922/

Technology Choice Jeopardy
https://cnx.org/content/m43922/

Socio-Technical Systems, Technology, and Human Capabilities
https://cnx.org/content/m43922/

STS PowerPoint
https://cnx.org/content/m43922/

Writing Cases Pesentation
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Value Profile: Responsibility
This module profiles the value, responsibility. After presenting its root metaphor, it provides a discussion of key features, kinds and senses, and useful frameworks. Responsibility is a complex value. The route this module takes through this complexity is to pull together its different senses and kinds as variations of "response to relevance." Two exercises at the end will provide an anchor for students to work with responsibility's root meaning and to see how it develops and changes as it appears in different cases. This first publishing is subject to revision as author gathers assessment data and carries out further research into moral responsibility.

Introduction: The Root Meaning of Responsibility

The College of Business Administration at the University of Puerto Rico at Mayaguez has recently adopted a Statement of Values. Rather than allowing this document to become static, this community is committed to challenging the Statement of Values. The first challenge, brought about by students, was to translate the Statement of Values into Spanish. (The original was drafted in English in order to be integrated into Business Administration's efforts at AACSB accreditation.) This module forms part of a series of modules that profile in detail each of the constituent values of Business Administration's Statement of Values: justice, responsibility, respect, trust, and integrity. Its purpose is to provide the basis for a conceptual challenge to the Statement of Values. Different constituents or stakeholders of Business Administration, students and staff, have expressed interest in more sharply distinguishing key values (e.g. trust and responsibility) and in exploring the overlap and distinctions between values (e.g., integrity and responsibility). This module profiles responsibility. Others will profile the remaining values, justice, respect, trust, and integrity. Finally, an introductory module will introduce students to value-based decision making while a concluding module will present a value realization framework taken from software engineering. This module profiles responsibility by providing its root metaphor, key features, kinds and senses, and useful frameworks. It concludes with exercises designed to help students understand responsibility's root metaphor, response to relevance, and how it has been metaphorically projected onto increasingly "higher" moral spaces, moving

from the negative to the positive, the minimal to the exemplary, and the reactive to the prospective.

Root Meaning: Response to Relevance
Herbert Fingarette's formula, **"responsiveness to essential relevance"** pulls together two strains used to test for criminal insanity, the cognitive test which lies in the ability to appreciate the moral quality of one's actions and the volitional test which lies in the ability to act on one's perception of moral relevance. This module converts the test for legal competence, "responsiveness to essential relevance," into a the root metaphor for moral responsibility, namely, "(moral) responsiveness to essential (moral) relevance." Moral responsibility brings together two skills. First, the responsible agent has the ability to zero in on the morally relevant aspects of a situation. This comes from cultivated emotional and perceptual sensitivities. (You are sitting on a crowded bus and begin to feel empathically the uncomfortableness of the elderly lady standing in the center.) Second, while keeping the morally relevant aspects in focus, the responsible agent is able to design and execute a morally responsive action that answers to the moral relevance in a situation. (You rise from your seat in the bus and offer it to the elderly lady.) This volitional ability requires cultivating powers of control, skill and knowledge. **The root meaning of responsibility is, thus, (moral) responsiveness to essential (moral) relevance.** See Fingarette, The Meaning of Criminal Insanity, 186-7.

Metaphorical Structure
Responsibility is metaphorically structured. Metaphor, for Johnson and Lakoff, is more than just a figure of speech. It is a projection of meaning and structure from one domain, a familiar experience termed the **source domain**, onto another less familiar domain termed the **target domain**. Seeing the unfamiliar in terms of the familiar or extending existing meaning and experience to cover new regions, represents, for Johnson and Lakoff, a fundamental imaginative activity. So, our experience of physical forces and their interactions is encapsulated into the image schema, stimulus-response. Then this basic structure is projected onto the moral domain: stimulus-response becomes perception of relevance-response to relevance. This projection doesn't merely repeat the original experience; it does not reduce the moral to the physical. Stimulus-response is expanded by the insertion of

moral content. Stimulus becomes sensitivity to what is morally salient in a situation; we use perceptual and emotional sensitivities and skills to zero in on the moral aspects of a complex situation. Response, when projected onto the moral domain, is no longer unthinking, automatic; now it becomes the formulation of action that is calibrated to moral salience. This metaphorical structure of responsibility is subject to further elaborations. As you will see in the exercises below, responsibility begins as a punitive response to failure to achieve the minimally moral. We blame an engineer for an accident when it results from her failure to exercise even minimal due care in the design and testing of a product. But, through repeated metaphorical projections, moral repsonsibility is repeatedly elaborated onto higher and higher moral spaces as the pursuit of excellence, not just the avoidance of blame. In short, the metaphorical elaboration of the root meaning of responsibility allows us to see continuity between its negative, reactive, and blame-center forms and more advanced positive, proactive, and supererogatory praise-worthy forms. Just below is a slide that taken from a presentation given by the author on "Teaching Moral Responsibility" at the annual meeting of the Association of Practical and Professional Ethics, March 2012; it shows the elaboration of moral responsibility through the repeated projeections of the image schema stimulus-response or the experience of physical force and its interactions. (This account of responsibilty as a metaphor is taken from Mark Johnson, The Body in the Mind, p. 14. See other Johnson references listed below.)

Image schema: *Physical stimulus "evokes" a reflex response*
(Built upon Johnson, BIM)

Metaphor: Image schema (= **source domain**) is projected onto the abstract moral realm (=**target domain**)

Stimulus /
Response

Perception of
Moral relevance-
Responsive action

Source domain (physical force and interactions) has "internal structures that give rise to constrained inferences" in **target domain** (abstract moral realm) (Johnson, MB, 144)

Positive and Negative Senses of Responsibility

Negative Rsponsibility
The negative sense focuses on assigning blame for the untoward. (Untoward means something negative like harmful or unduely risky, etc.) This sense of responsibility works, primarily, from the threshold of the morally minimum. If you are below this threshold, several things happen: you are subjective to reactive attitudes (resentment, indignation, guilt), blame or approbation, and punishment. It is this sense that Bradley had in mind when he asserted that "repsonsibliity is necessarily connected to punishment." In this domain, the goal is to stay out of trouble which is the same as staying above the minmally moral. Good enough to stay out of trouble but not really good. (Hobbes, in Calvin and Hobbes, tells Santa Clause that he has not committed any murders or robbed any banks this year. Hobbes tells him that this might not be enough; not doing wrong does not fully constitute doing good.)

Positive Responsibility
Positive/proactive responsibility focuses on preventing harm and striving for supererogatory value-realization. You are working on an assembly line and see your coworker unconsciously taking a risk that could, under the right configuration of events, cause an accident. You make him aware of this risky habit and work with him to change it all the while taking care not blame him or attribute it to him as a fault. Your coworker could, and at least initially probably will say, that it is none of your business. But you make it clear that you are doing this because you are concerned and want to work with him to avoid an injury. More and more, companies are working to take injury prevention out of the negative and punitive stance and make it part of an approach that emphasizes non-fault prevention. But even more than prevention, positive responsibility can lie int he pursuit of the supererogatory. Here one takes responsibility even if prior to the act of commitment, it was not not obligatory. One delivers an unexpected good work or even offers a sacrifice of an important interest in the pursuit of an excellence. Positive responsibility sets behind itself issues of punishment and blame and recasts itself as the pursuit of excellence. In its most positive sense, responsibly becomes a virtue. (Pritchard, Harris, and Rabins discuss positive senses of responsibility in **Engineering Ethics: Concepts and Cases** 99-116. 2nd Edition. See also William F. May, "Professoinal Virtue and Self-Regulation," in ethical Issues in Professional Life, Oxford University Press, 1988. Finally see John Ladd "Bhopal: An Essay on Moral Responsibility and Civic Virtue" in **Journal of Social Philosophy** Vol. 22(1):73-91.)

Moral Responsibility and the Law

Moral responsibility cannot be reduced to legal responsibility. Yet, as Fingarette's investigation of criminal insanity shows, the two overlap and frequently compliment one another. Here it is absolutely essential to emphasize one fundamental difference. Legal responsibility focuses on the boundary between what is above the threshold of the minimally moral and what falls below. Moral responsibility begins with this minimal threshold or boundary but then proceeds to outline higher regions of what can be termed exemplary or supererogatory space. Another way of putting this is to hold that while moral responsibility can reflect legal responsibility by laying out

the gateway between the blameworthy and the acceptable, it can also be formulated as a virtue or an excellence. Legal responsibility remains necessarily connected with blame and punishment. Moral responsibility at some point leaves these behind as it becomes associated with different morally reactive attitudes such as gratitude, admiration, and pride.

Responsibility under Civil Law

- A Tort is a wrongful injury. To prevail in a tort one must prove negligence, recklessness, or intent.
- Negligence emerges out of the background of the normal or reasonable where due care is exercised. In other words, it arises from the failure to exercise due care.
- Recklessness goes a step further. One consciously risks a harm but does so in pursuit of another intention or goal. So you may drive recklessly through the university but justify--in your own mind--this risk incurred on others because you are late to your job interview.
- Intent is the worst of all three. Here the harm in question forms a central part of the agent's intention. The employee fired from his job intentionally introduces a virus into the workplace computer network shutting it down and producing financial loss. Injury intentionally brought about not only triggers compensation to make the victim whole; it may also trigger punitive damages, an invasion of civil law by criminal law.

An interesting debate has developed in the field of engineering ethics about standards of due care. Larry May sets forth a standard of minimal care which is a threshold below which an engineer cannot fall without incurring negligence. While the law is adept at establishing a minimal level of acceptable care, engineers as professionals should be held to higher standards. Hence, Harris, Pritchard, and Rabins in an influential textbook on engineering ethics, Engineering Ethics: Concepts and Cases, argue for higher standards of care such as normal or reasonable care, good works, and exemplary care. Engineers should be encourage to explore higher levels of care and responsibility; but this is held back by the specter of blame. It is certainly appropriate to hold engineers responsible and blameworthy for failure to live up to minimum standards of care and practice. But above this level, when should blame drop out. Certainly engineers who fall below

reasonable or normal standards exhibit moral deficiency. (The term comes from Ladd.) But what about taking on tasks that are above and beyond the call of duty? Suppose an engineer elects not to bring about a good work or make a substantial self-sacrifice to obtain a community good. Certainly such an action cannot be blameworthy since it falls well above the minimum threshold of acceptable practice. Nor does it seem to admit of moral deficiency. Hence, as responsibility is projected into increasingly positive and supererogatory space, what terms should we employ to replace blame, punishment, and moral deficiency? See Martin Curd and Larry May, "Professional Responsibility for Harmful Actions" in **Module Series in Applied Ethics**, Center for the Study of Ethics in the Professions, Illinois Institute of Technology Kendall/Hunt, 1984. See also **Engineering Ethics: Concepts and Cases**, Chapter 5.

Criminal Responsibility

- This area of the law applies to human individuals.
- To prevail in a criminal trial, one must first prove **mens rea** or a guilty mind. This is essentially an intention to break the law, to commit the crime in question.
- It is also necessary to prove that the target of a criminal suit have actually committed the guilty, law-breaking action, termed an **actus reus**.
- Finally, it is necessary to prove that the **mens rea** caused and guided the execution of the **actus reus**

Back to O.J. Simpson

- Reflecting on the trial of O.J. Simpson can help distinguish burden of proof in a civil and criminal law. Burden of proof is what the plaintiff has to prove to prevail against the accused or defendant. In a criminal trial, the burden of proof is set quite high. (Why do you suppose this would be?) The prosecution has to prove the defendant guilty "beyond a reasonable doubt." It is lower in a civil trial where the plaintiff only has to prove the case against the defendant by establishing a "preponderance of evidence." This is largely quantative; if 51% of the evidence falls on the side of the plaintiff, then the case against the defendant stands.

- OJ Simpson was found innocent in the criminal trial. The prosecutors were unable to establish his guilt beyond a reasonable doubt.
- But in the civil trial, his accusers were able to accumulate a preponderance of evidence against him. The difference in burden of proof thus explains why Simpson lost the civil trial but won the criminal trial.

Corporate Responsibility

While this is not the place to discuss this topic in detail, a few things can be said of corporate responsibility in summary. This notion, to say the least, is controversial. Much of this follows from the characteristics of criminal responsibility. To be criminally responsible, one must have a guilty state of mind (**mens rea**), carry out a guilt or law-breaking act (**actus reus**), and there must be a close connection between the two such that the mens rea guided the actus reus in its design and execution. But to attribute moral responsibility to a corporation would be to anthropomorphize it, to attribute to it a personality that would include mental states and body that existed above and apart form the minds and bodies of its members or employees. One ethicist, John Ladd, warns that this stretches to a breaking point, the thin concept of moral personhood; applying this to corporations empties personhood of its content and renders the concept ineffective. Or as John Danley puts it, there is nothing wrong with the anthropomorphic bias (read focus or meaning) of moral concepts such as responsibility, agency, and personhood. See Manuel Velazquez, "Why Corporations are Not Morally Responsible for Anything They Do," **Business and Professional Ethics Journal**, Vol. 2, No. 3: 1-18.

Nevertheless, there are credible arguments for corporate responsibility based on the premise that attributing responsibility to corporations does not preclude holding human individuals responsible. Peter French argues that under certain conditions, the actions of human individuals can be redescribed as corporation actions. The "device" that "licenses" this redescription is called a Corporate Internal Decision Structure or CIDS. (See French, Collective and Corporate Responsibility. Complete reference below.)
Constituents of CIDS

- **Corporate goals**. These are either objectives found in the charter or informal ends that can be uncoveed by becoming immersed in the day to day operations of a corporation.
- **Corporate decision making and recognition procedures**. These compose the grammar of corporate actions. Included would be procedures for soliciting travel funds, standard operating procedures, hiring and firing practices and other procedures that are followed for routinely corporate acts. These are at the center of attributions of corporate responsibility for these procedures are the ways in which we can see that an action has been authorized by the organization within which and for which it was performed.
- **Corporate roles**. Was the action performed by an individual designed to carry out a corporate role or was this action performed by the individual in some other capacity?
- **Corporate Organizational or Management Systems**. These systems display the relations of the corporate roles and the individuals occupying them. Usually portrayed by the corporate flow chart, these can display any number of kinds or types but two that come to mind. In hierarchically structured organizations power flows down the chain of command while information flows from the bottom-up; in horizontally organized corporations, power is distributed across relatively autonomous interdisciplinary work teams, each of which is designated responsible for the performance of certain tasks.

Kinds of Responsibility

The root metaphor of responsibility is "response to essential relevance" or "response to relevance." But this root metaphor has been used to structure different moral, legal, social, and other practical domains. The result are several different senses of responsibility. This section will help you sort out some of the different senses by providing brief, provisional definitions of causal, capacity, blame, role, and corporate responsibility.

- **Causal Responsibility**: Physical motions or events produce other physical motions or events. The hurricane blew the panel off the roof and caused other damage to the house.

- **Capacity Responsibility**: Conditions for attributing an action to an agent for the purposes of assigning moral praise or blame.
- **Blame Responsibility**: Blaming individuals for their actions, attitudes, or characters that result in untoward or negative consequences
- **Role Responsibility**: To stand committed to realizing the values, goods, or interests around which a social, occupational, or professional role is built or oriented.
- **Corporate Responsibility**: The legal and moral practice of treating corporations as moral agents (not necessarily as persons) and holding them accountable or answerable for their actions. Corporate moral responsibility should not exclude attributing moral responsibility to individuals for their actions. Yet, under special conditions, the actions of individuals can be re-described as corporations or re-description can reveal a corporate dimension or aspect to individual actions.

There are different accounts of types of responsibility in H. L. A. Hart, "Responsibility and Retribution," in Computers, Ethics and Social Values, Deborah G. Johnson and Helen Nissenbaum, Eds. Upper Saddle River, NJ: Prentice Hall, 1995, pp. 514-525 as well as K. Baier, "Types of Responsibility," in The Spectrum of Responsibility, Peter A. French, Ed. New York: St. Martin's, 1991, pp. 117-122.

Useful Responsibility Frameworks

Responsibility has positive and negative senses. In its negative sense, responsibility is the practice of assigning blame and setting the stage for punishment as a means of discouraging modes of action that lead to bad results. But the positive sense--so to speak--pivots off this negative sense and reconstructs the negative and reactive as positive and proactive. (More on this below.) This section presents F.H. Bradley's conditions of imputibility, requirements that must be in place in order for us to hold one another responsible for our actions and their results. Combining the perspectives of Bradley and Strawson, we could say that one fits into the **participant attitude** if one satisfies the conditions of imputability, that is, self-sameness, moral sense, and ownership. Failing this, one could still be in the participant perspective but, due to special circumstances, be unable (temporarily)to act responsibly. But Strawson's **objective attitude** is more

fundamental and applies to children, the disabled, and the insane. In this case, we are dealing with individuals who are incapable of fulfilling the conditions of imputability, especially self-sameness and moral sense. In this case, the individual falls outside the practice of responsibility, the participant attitude, and into what Strawson terms the objective attitude. We can treat such an individual as "as a possible predictable entity 'to be managed or handled or cured or trained; and perhaps simply to be avoided.'" (Margaret Urban-Walker in **Moral Repair** quoting--in part-- Strawson, "Freedom and Resentment."

Capacity Responsibility (Conditions for Imputing or Assigning Responsibility)

- **Self-sameness** (Identity): The agent caused the action and the agent's identity persists or continues from the moment of act to the moment of accountability. F.H. Bradley: "I must be throughout one identical person. We do not say, 'He is not the same man that he was,' but always in another sense, to signify that the character or disposition of the person is altered." **Ethical Studies**, 5
- **Moral Sense**: The agent has skills pertinent to honing in on moral relevance and collecting thought, emotion, and will into responsive action. As Bradley puts it, "Responsibility implies a moral agent. No one is accountable, who is not capable of knowing (not, who does not know) the moral quality of his acts. Wherever we can not presume upon a capacity for apprehending (not, an actual apprehension of) moral distinctions, in such cases, for example, as those of young children and some madmen, there is, and there can be, no responsibility because there exists no moral will." **Ethical Studies** 7
- **Ownership**: Minimally, this condition requires the absence of ignorance and compulsion. As Bradley puts it, "it [the act] must have belonged to me--it must have been mine....The deed must issue from my will; in Aristotle's language, the arche must be in myself. ["Arche" is the Greek workd for beginning or principle.] Where I am forced, there I do nothing....Not only must the deed be an act, and come from the man without compulsion, but, in the second place, the doer must be supposed intelligent; he must know the particular circumstances of the case;;;;If the man is ignorant, and if it was not his duty to know...then the deed is not his act." **Ethical Studies**, 5-6.

- Ignorance and compulsion are not excusable if the they result from past, negligent actions. For example, if my failure to find crucial information in the past--"I don't want to know..."--caused my present ignorance it is not excusable. If my past actions and choices got me into the present compelling situation, then I am also responsible.
- Bradley's definition of compulsion is, roughly, the production in an individual of a state of mind or body that is contrary to his or her actual will. Holding a loaded gun to my head and telling me to sign the contract, is compulsion because the fear it produces in my mind leads me to an action that, absent the gun, I would not do. Tripping me produces a state of body--falling--that is contrary to my actual will of standing straight.

More on Strawson

- **Participant reactive attitudes**: "What I have called the participant reactive attitudes are essentially natural human reactions to the good or ill will or indifferences of others towards us, as displayed in their attitudes and actions" Strawson, "Freedom and Resentment," 10-11. For Strawson, responsibility arises when we hold one another responsible for living up to certain standards and when we respond with "reactive attitudes" when there is a failure to live up to these standards.
- **Objective attitude**: "on the other hand, [the objective attitude] withholds subjecting oneself and others to reactive attitudes. In cases of insanity, childhood, or some other relevant deficiency, the individual does ot fit in the network of relations supported by reactive attitudes." "Freedom and Resentment" 18-19.
- **Examples**: Resentment, Indignation, Shame.
- **Positive Correlates**: Gratitude, Admiration, Pride

Responsibility as a Virtue
Responsibility, when reconstructed in exemplary moral space, becomes a virtue, the pursuit of an excellence. This section pivots from the reactive model set forth by thinkers like Bradley and Strawson to a more prospective model. This positive model that portrays responsibility as a virtue targets

three skill sets: Role-taking, transperspectivity, and techno-social sensitivity.

- **Role-Taking**: Projecting into the standpoints of others to assess situations, formulate moral relevance, and outline actions. Requires the ability to explore multpile perspectives (multiple framings) and to move quickly from one to the other.
- **Transperspectivity**:"unravel or trace back the strands by which our constructions weave our world together." Also, the ability to "imagine how thwe world might be constructed differently." Johnson quotes Winter in Johnson 1993, 241. Steven Winter: "Bull Durham and the Uses of Theory" in Standford Law Journal, 42, 639-693.
- **Techno-social Sensitivity**: From Harris, SEE 2008: "Critical awareness of the way technology affects society and the way social forces, in turn, affect the evolution of technology."

Exercises

Identify the Relevance and Response components of the following cases:

- The disciplinary tribunal of the Puerto Rico State Society of Land Surveyors and Professional Engineers has a moral tribunal that investigates violations of the society's code of ethics. Individuals brought before the tribunal and found guilty of code violations are subject to temporary or permanent expulsion from membership of this professional society and from the privileges of attendant upon being a licensed professional engineer. Discuss rule compliance from the standpoint of "response to relevance." What is the relevance component? What is the response component?
- The Puerto Rican government held public hearings to review a private company's petition for permission to build a windmill farm on privately owned land located near a publicly owned nature preserve. (Bosque Seco de Guanica) The public hearings wer held in a distant place, at an expensive and exclusive facility, and at an inconvenient time for many of those opposed to the project. This activity was not well publicized. What aspects of this situation fall under the umbrella

of moral salience or moral relevance? What would be morally appropriate responses available to those opposing the project?

- An engineer passes a laminating press room and notices that a fine white powder covers everything in the room, including the operator. The engineer talks with the operator and finds out that he has been working at this position for ten years. The operator says he is not aware of any evidence that this powder is dangerous or hazardous but has not really looked into the matter. He also appears not to be using any safety equipment to avoid exposure to the white powder. What is the moral salience of this situation? What would be some relevantly moral responses to this salience?

- A family is without electricity in the aftermath of a severe hurricane in a tropical country. Neighbors have generators which they run all day and night to keep their houses air conditioned and their appliances continually running. The family without a generator finds that the noise from their neighbors generators prevents them from sleeping at night. They finally give up starying in their house and stay in a hotel for the duration of the time it takes to restore their electricity. What is the moral salience of this situation and what are possible responsive actions that the neighbors with generators could take?

- Nathaniel Borenstein is a pacifist. He is also a computer programmer whose skills are in high demand for those developing military technology. But he has a strong commitment not to collaborate with the military or associated industries. So when NATO contacts him to assist them in building a training program for missile launchers, he politely but firmly refuses their overtures. But when he learns that the training program they have developed so far is embedded, he reconsiders his vow of non-participation. An embedded training program could mistakenly inform trainees that the system was in training mode when it was actually in operational mode. What is the moral salience of this situation and what is it about Borenstein that makes him uniquely qualified to attend to this moral salience? What kind of responsive actions are available to Borenstein? Would continuing his policy of non-participation be considered one of these options?

Responsibility in Dickens' Bleak House

Bleak House is a novel written by Charles Dickens. In it, Dickens creates characters who embody different models of responsibility. Below are these characters and a brief sketch of their approach to responsibility. Read the sketches below. Then answer the following questions.

Character Sketches

- **Esther Summerson**: Esther believes in helping those around her. While she spends almost no time worrying about her own needs, she is entirely focused on those of her surrounding family, guardian, friends, and community. She finds an abstract conception of duty to be both difficult to comprehend and distracting since she is quite busy with helping those in her immediate surroundings.
- **Mrs. Jellyby**: Jellyby is entirely focused on the plight of the natives of the distant country, Borioboola Gha. She works tirelessly writing letters that inform others of their plight. She organizes activities to raise funds to help develop coffee plantations and to provide hungry children with food. While focused on the distant, she is completely unaware of what is going on around her. Her husband has lost his work and is depressed. Her children—we never know how many—run around unsupervised. There are several servants in the household but they drink, argue among one another, and generally do little to carry out their basic duties. When introduced to Jellyby, Esther notes jellyby's peculiar habit of looking through one as if she were focused on the distant plight of those in Borrioboola Gha. Dickens calls Jellyby a "telescopic philanthropist."
- **Harold Skimpole**: Harold Skimpole presents himself as a child. His lot in life is to give others pleasure by helping him. As for his own situation, he has a family that he neglect but somehow finds ways of attaching himself to those who supply him with the finer things in life: good food, drink, and fine clothes. He incurs debts which he foists off on other by pleading that he is incapable of understanding figures. He is but a child and all he asks for is to be able to live and to enjoy life.
- **Richard Carstone**: Richard Carstone is a handsome and talented young man. But he has trouble focusing on a career. He engages in studies in medicine and the law but is unable to focus on them and soon abandons them for a career in the military which he also abandons. He is a minor party to a long and complicated lawsuit. He

devotes himself to its resolution placing all his hopes and efforts on coming into a substantial inheritance. His guardian, who was initially the source of his trust and love, is later seen by him as an opponent in the lawsuit. He interprets all his guardian's actions as motivated by the desire to win the lawsuit and to claim the money that properly belongs to him (Richard).

- **Mr. Tulkinghorn**: Tulkinghorn is a highly regarded lawyer, a keeper and discoverer of secrets. He has a very British view of society. A person's duty is to stay loyal to the duties of the station in which he or she was born. Those born aristocratic carry out their station of high fashion and the maintenance of large estates while those who are poor are relegated to working in the drastic employments available to their station. His job is to keep people in their stations and to prevent the rise of those who would usurp the stations of those born higher. In this way, he uses the law to maintain the natural order of society.

Questions:

- Which model of responsibility works best for you, Esther's "circle of duty" model where one starts with one's immediate surroundings or Jellyby's "telescopic" model where one focuses on the distant. Start by considering what would be the strength and weaknesses of each.
- Do you believe Skimpole is sincere in his project of avoiding responsibility. What kind of actions or thinking could Skimpole show that would give the lie to his claim that "I am only a child"?
- Richard places all of his hopes and dreams on the resolution of the lawsuit that encircles all the characters of Bleak House. Do you think this project sustainable? How could such a commitment render one less responsible, that is, less capable of response to relevance?
- Dickens seems to imply by his portrait of Jellyby and Esther that one can either attend to one's immediate surroundings or one can focus, telescopically, on what is distant. Is this "disjunction" necessarily the case? Can you think of anyone who has managed to combine both perspectives? Can you think of anyone else like either Esther or Jellyby? How are they able to balance these poles of responsibility?
- Dickens takes exception to two themes embodied in the lawyer Tulkinghorn. First, Tulkinghorn reduces moral responsibility to legal

responsibility? What do you think Dickens finds wrong with this. Second, for Tulkinghorn, the goal of legal responsibility is to maintain social order. Tulkinghorn's conception of social order is, in many respects, Medieval. He finds social order in every person's finding their station or social position, remaining loyal to that station, and performing its attendant duties. When someone rises above their station, Tulkinghorn feels it his duty to put them back in their place. What do you find wrong with this project? Do you think this problem endemic to responsibility or merely to Tulkinghorn's particular view of responsibility?

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Three Views of CSR (Corporate Social Responsibility)
This module explores different models of CSR (corporate social responsibility) including a shareholder model (based on the arguments of Milton Friedman), the stakeholder model (based on the work of Evan and Freeman), and an alliance model advocated by Patricia Werhane. Students will develop a framework based on an exercise to determine a social contract between society and business. They will use this social contract to assess each CSR approaches. Then they will develop a CSR program for the hypothetical corporation, Burger Man. (Based on an exercise developed by Paul Thompson.) This module is being developed as a part of a project funded by the National Science Foundation, "Collaborative Development of Ethics Across the Curriculum Resources and Sharing of Best Practices," NSF-SES-0551779. It is currently being used in the courses "Business, Society and Government" and "Corporate Leadership and Social Responsibility" being taught at the University of Puerto Rico at Mayaguez
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This is an example of an embedded link. (Go to "Files" tab to delete this file and replace it with your own files.)

- The first two links to this module are to sample corporate social responsibility statements put out by McDonalds and Starbucks. These will help you to benchmark your own efforts both in the fictional Burger Man case and in your efforts to develop CSR reports for real companies.

- The other link is a story from reporter, Paul Solomon, that reports on the annual Business for Social Responsibility conference. This story, first broadcast on December 23, 2004 reports on outstanding and suc- cessful efforts on CSR. Its title is "Good Business Deeds" and it was accessed for this module on August 17, 2008 at the following URL: http://www.pbs.org/newshour/bb/business/july-dec04/corporate_12-23.html

Introduction

This module will introduce you to the theme of corporate social responsibility. Three representative cases will help to pose the central problems and basic issues of CSR. Then you will work on developing a social contract between the business corporation and society to articulate the interests, goods, and rights at stake in CSR. Three different approaches dominate this field: the shareholder approach set forth by Milton Friedman, the stakeholder approach articulated by Evan and Freeman, and Patricia Werhane's alliance model. Finally, you will work on developing a CSR program for the hypothetical corporation, Burger Man. This will be based on a shareholder meeting that consists of six or seven stakeholder presentations. (You will play the role of one of the stakeholders.) Your CSR program will address and integrate the needs and interests of the Burger Man stakeholders.

Three CSR Challenges
Patricia Werhane discusses how six corporate organizations deal with three CSR challenges: (1) carrying out oil drilling in a corrupt political environment, (2) working with suppliers who impose sweatshop conditions on employees, and (3) addressing the HIV/AIDS challenge in Africa. Each challenge elicits two corporate responses, one from a shareholder or stakeholder perspective, the other from an alliance perspective. Shell Oil's response to political corruption in Nigeria will be compared with Exxon/Mobile's response in Chad and Cameroon. Nike's answer to public criticism of the employment practices of its third world suppliers will be compared to Wal Mart's reputedly heavy-handed treatment of its employees and suppliers. Finally, while the pharmaceutical industry has developed an expensive drug cocktail to treat HIV/AIDS in patients in developed nations, the NGO (Non Government Organization), the Female Health Company, has designed a program to distribute of condoms to

prevent infection in the first place. These paired corporate responses to CSR challenges are not provided in support of the position that the superiority of the alliance approach is a "no-brainer." Instead, they provide you with a menu of CSR strategies that you will evaluate using the CSR framework you will develop out of the social contract that between business and society. These three CSR challenges come from Werhane (2007)

Operating in a Corrupt Environment

- A big challenge facing multinational corporations is how they should respond to local corruption. Both Shell Oil and Exxon/Mobile sought to carry out drilling operations at sites plagued by corrupt local and national governments.
- Shell took a shareholder approach arguing that their primary CSR was to their stockholders and that involvement in corrupt local politics would be tantamount to paternalism.
- Exxon/Mobile, on the other hand, adopted a more active approach. They took expensive measures to mitigate the environmental impact of their operations. They also hired and provided technical training to local residents. Finally, they worked to ensure that the revenues they introduced into the local communities were not lost through political and business corruption.
- What are the CSRs of multinational corporations that operate in corrupt local environments? Are these fashioned around the minimal obligation of creating no additional harm? Or should they expand to preventing harm (if possible) that others are about to inflict? To move even further up the ladder of responsibility, do multinational corporations have positive, supererogatory responsibilities that consist of adding value to the communities they do business in?

Vicarious CSR: Responding to Supplier Sweatshops

- Vicarious responsibility occurs when one agent accepts responsibility for actions executed by another. For example, under agency theory, the principal bears overall moral and legal responsibility for the action since he or she has originated it. Although the agent executes the action, he or she is responsibility only for executing the action faithfully and treating the principal's interests as his or her own.
- In this context, can we hold corporations such as Nike and Wal Mart vicariously responsible for the morally questionable actions of their suppliers? If so, then under what conditions?
- Nike fell under siege when the press found out that its suppliers based in the third world imposed harsh, sweatshop conditions on their employees, including child labor. Nike could have argued that this was beyond the scope of their repsonsibility. How could **they** be held **vicariously responsible** for the actions of another? Their job was to produce shoes at the lowest possible price to deliver an affordable quality product to customers and to maximize shareholder value. But Nike went beyond this minimal responsibility to carefully vet suppliers and to work with them to improve working conditions. Thus, they expanded the scope of their CSR to include improving working conditions for, not only their employees, but also the employees of their suppliers.
- Wal Mart has been identified by Collins and Porras (Built to Last) as a highly successful and visionary company. It has certainly led the way in providing consumers with high quality products at surprisingly low prices. But the savings it provides to customers and the high returns it guarantees investors are purchased at a high price. Wal Mart prevents its employees from joining unions which has lowered their wages and restricted their health and retirement benefits. Wal Mart employees are also expected to work long hours for the company. While it provides cheap, high quality products to its customers, Wal Mart pushes suppliers narrowing their profit margin and placing upon them the responsibility of supplying product just-in-time to meet demand.
- In its earlier days, Wal Mart targeted small towns. Their competitive practices forced less aggressive, local business to leave. While they have brought considerable benefits to these communities, they have also seriously changed established business and social structures.
- Finally, Wal Mart, like Nike initially, exercises minimal supervision over their suppliers many of whom are oversees. Wal Mart suppliers also have been known to impose harsh working conditions on their employees.

Some CSR Questions for Nike and Wal Mart

1. From a broader CSR perspective, is Nike maximizing stakeholder value? Is it redistributing burdens and costs from customers and investors to its suppliers and their employees? Does CSR allow this redistribution of the corporate wealth form the shareholders to other stakeholders? (Think about Friedman's arguments here.

2. If it is necessary to trade off stakeholder stakes as both Wal Mart and Nike do, which trade off is more just? Nike's distribution of its wealth from its stockholders to the needy manifested in its efforts to improve the working conditions and income of the employees of its suppliers? Or Wal Mart's distribution of benefits to its stockholders and its comparatively prosperous customers?
3. Which model would Friedman prefer under the his version of the shareholder view of CSR? Explain and evaluate.
4. Which model would be preferable by Evan and Freeman under the stakeholder view? Who are Nike and Wal Mart's stakeholders? What are their stakes? How should the wealth produced by these two corporations be distributed among their stakeholders?
5. Werhane, in her alliance model, argues for the importance of a CSR model that decentralizes the corporation and facilitates morally imaginative solutions. Why does she argue that Nike's program is than Wal Mart's from this perspective? What could Wal Mart do to improve its CSR on the alliance view?

Facing the AIDS Challenge in Africa

- The widespread and devastating effects of the AIDS epidemic in Africa are well known. But what are the responsibilities of corporations in the face of this terrible CSR challenge? Should they do business as usual and allow others who are perhaps more qualified respond to this pervasive social problem? Or should they recognize a broader responsibility to channel their wealth, knowledge and expertise toward mitigating this social problem?
- Pharmaceutical corporations invest huge amounts of money in research and development. The market place is a good place for both encouraging this necessary risk and for distributing it among several groups and interests. Developing new medicines requires costly research. So Friedman's question is highly pertinent here: does imposing CSR on a corporation do more harm than good because it interferes with the delicate mechanism of the market?
- At any point along the way, the product may not meet expectations, a competitor may beat the pharmaceutical to the market, the regulatory process may delay or even prevent sale, and so on. The rewards from patenting a successful medicine are astoundingly high. But heavy, possibly devastating losses are also possible. Adding CSR to the mixture may be the formula for corporate disaster.
- Pharmaceutical corporations also face daunting challenges from regulatory agencies such as the Food and Drug Administration. New products must be exhaustively and painstakingly tested to avoid problems that have arisen in the past such as the Dalkon Shield and Thalidomide. Again, considerable effort must be expended in exploring the middle and long term consequences accompanying product and drug use, and all of this before the product can be marketed and profits made. Government regulation also raises another problem. Is government prodding necessary to force corporations into a proper CSR posture? Or should corporations be allowed to develop voluntarily their own CSR responses?
- In the case at hand, pharmaceutical companies have invested considerable resources to carry out research into medicines that control HIV infection and prevent it from developing into full-blown AIDS. But these treatments are very expensive and bring with them considerable side effects. An anti-AIDS chemical cocktail can cost patients in developed nations between 15 and 20 thousand dollars per patient per year. This is far beyond the financial resources available to a typical HIV/AIDS patient in Africa. Some NGOs and critics of the pharmaceutical industry accuse the latter of gouging victims and drawing excess profits from the misfortune of others. A spokesperson for "Doctors Without Borders," for example, claims that the AIDS treatment "cocktail" that costs U.S. patients 15 to 20 thousand dollars could be made available to Africans at less than 300 dollars per patient per year. Pharmaceuticals, according to their critics, need to rethink their CSR, cease operating as for-profit businesses, and make these drugs available to third world sufferers at cost.
- What are the CSRs of multinational pharmaceutical corporations for making HIV/AIDS drugs available to victims in the poverty-stricken nations of Africa? Are they responsible for charging what the market will bear? Assuming they have the right to recoup their heavy investment in research, should governments, recognizing the necessity of compensating drug companies for their research, buy these drugs and redistribute them at little or no cost to those who can't afford them? Or should the pharmaceuticals charge more to those who can pay and less to those who cannot? (This redistributes the burden of cost from the haves to the have nots.)
- Many NGOs have taken the stance that their responsibility lies in pressuring drug companies to do the right thing and donate medicines to patients who cannot pay. This is their corporate social responsibility, and the pharmaceutical industry certainly has enough money to do this.

- But others have tried to reframe this issue using moral imagination. Treating individuals for HIV infection once they have contracted it is expensive no matter how you look at it. But, redefining the problem, can moderate and affordable measures be taken to prevent the spread of the disease?
- This is the imaginative approach taken by the Female Health Company which has initiated a widespread effort to distribute condoms to those at risk for contracting AIDS.
- How does the approach of the FHO exemplify Werhane's alliance model? How should pharmaceutical companies respond to this kind of initiative? Is it necessary to frame the relation between the pharmaceutical industry and NGOs as an adversarial relation or should broader alliances be formed that coordinate the efforts of these groups?

The Social Contract between Business and Society

Every contract is built on the basis of three conditions (1) free and informed consent, (2) a quid pro quo, and (3) the rational self interest of the contracting parties.

- **Free and Informed Consent**: No contract is legitimate that is based on force, fraud or deception. The parties must enter into this agreement freely and without compulsion. They must understand the terms of the contract which excludes deception and fraud. In short, the contract presupposes the uncoerced participation of all the parties. To enter into the contract they must understand all the key issues and consent to the constitutive exchange.
- **Quid Pro Quo**: Quid Pro Quo literally means something in exchange for something. Every contract is built around a mutually beneficial exchange. I give you my baseball cap in exchange your ice cream. Most exchanges are simultaneous. But some are what Hobbes calls "covenants." Here I give you my baseball cap with the understanding that later this afternoon you will pass by your refrigerator, get my ice cream cone and give it to me. I give you my part now and trust you to carry out your part later.
- **Rational Self Interest**: Each of us should know the value of the items to be exchanged. (That is one reason why a contract requires free and informed consent.) This knowledge is determined, in part, by the preference schedules that we have developed as rationally self-interested beings. So a legitimate contract assumes that I have interests, that I am capable of determining what promotes these interests, and that I am rational enough to determine means to promote them and avoid other means that interfere with them.

Social Contracts
A social contract differs from other contracts because it is hypothetical. Business and Society have never sat down in a room and hammered out a contract outlining their relation. But this hypothetical contract provides a good means of making sense out of the relation that has gradually evolved between society and business. Forget for a moment the historical details of the relation between business and society. If this relation is summarized as a contract, what does society give to business? What does business give to society? Do these two institutions trust one another or do they each adopt means to monitor and control the other? What are these means? Treating the relation between business and society as a contract between two mutually consenting agents or actors does get some of the facts wrong. But it provides a useful "heuristic" device, i.e., a framework that will help us to summarize, structure, and, in a work, make sense of the relation between the two. Moving from the terms of this "contract" you will be able to develop a framework for understanding the social responsibilities of business corporations. This, in turn, will help you to understand the CSR challenges presented above and the CSRs of the fictional but realistic Burger Man corporation.
Exercise 1: In small groups, spell out the social contract between society and business.

- How can the absence of force, deception, and fraud be guaranteed in this contract? How should each side hold the other accountable? (This is especially the case where one side delivers at one time and the other side is trusted to deliver later.)
- What benefits can busines bring to society? How can society benefit business. Develop a table with one column listing what business has to contribute to society and the other what society has to contribute to business. This table is the heart of your social contract.
- Assume that society and business are rationally self interested. How does this effect the formulation of the goods of the exchange? How does this enforce the terms of the contract? Are these self interests divergent? (Then each side must monitor the other to prevent the corruption of the contract.) Are these interests

convergent? (Then the contract consists largely in building social capital and trust between the contracting parties.)

- Donaldson, 1993 uses social contract theory to account for the rights and duties of multinational corporations

Exercise 2: CSR and STS
Choose one of the CSR challenges above and construct a socio-technical table around it

Component / Embedded Value	Technology (Hardware)	Technology (Software)	Physical Surroundings	Stakeholders	Procedures	La
Justice						
Free Speech						
Property						
Privacy						
Safety						

STS Table

Three CSR Frameworks

Shareholder View
From Milton Friedman, "The Social Responsibility of Business is to Increase Its Profits." "But the doctrine of "social responsibility" taken seriously would extend the scope of the political mechanism to every human activity. It does not differ in philosophy from the most explicitly collectivist doctrine. It differs only by professing to believe that collectivist ends can be attained without collectivist means. That is why, in my book **Capitalism and Freedom**, I have called it a "fundamentally subversive doctrine" in a free society, and have said that in such a society, "there is one and only one social responsibility of business--to use its resources and engage in activities designed to increase its profits so long as it stays wihtin the rules of the game, which is to say, engages in open and free competition without deception or fraud." 1970 by New York Times Company

Stakeholder View

- A stakeholder must be distinguished from a stockholder. The latter owns a share of the corporation. On the other hand, a stakeholder is any group or individual that has a vital interest in the doings of the corporation. Hence the stockholder is a stakeholder of the corporation whose vital interest at play is the share owned of the corporation and the money invested in this share.
- There are several other stakeholders of the corporation. These include (1) employees, (2) customers, (3) suppliers, (4) local community, (4) surrounding governments, (5) the surrounding human and natural environment, and (6) the corporation's managers. (In some situations there are other stakeholders such as competitors.)
- Stakeholder theory requires that the corporation recognize and respect the vital interests of each of its surrounding stakeholders. This frequently issues in proposing stakeholder rights and assigning to others correlative duties to recognize and respect these rights.
- Stakeholder theory also requires that the corporation integrate interests where possible, mediate or broker conflicts between interests, and only trade off competing interests when absolutely necessary and when more

conciliatory efforts have already been made and have failed.
- See Evan and Freeman 1988

Werhane's Alliance Approach

- Werhane's alliance approach is similar to the stakeholder approach in that it recognizes several groups that surround the corporation and have vital interests that depend on the doings of the corporation. These surrounding groups are more or less the same as those in the stakeholder approach: owners, managers, employees, customers, suppliers, local communities, governments, the environment, etc.
- But Werhane makes two significant departures from the stakeholder approach. First, she uses moral imagination to distance the corporation from the problem solving process; the lens of problem solving refocuses on each of the other stakeholders. Whereas for stakeholder theory the corporation is the center of analysis and is visualized as surrounded by its stakeholders, the alliance approach decentralizes the corporation and alternatively visualizes each stakeholder as the center for the purpose of framing problems and generating solutions.
- Second, the alliance approach sees the corporation as a part of a system of interrelated and interdependent parts. Hence, each problem situation presents a system formed of the corporation, owners, managers, employees, suppliers, customers, local communities, and governments. Problems emerge from value conflicts within and between the constituent parts of the system. They are solved through the cooperation of the different constituencies of the alliance.
- While this approach does not lend itself to algorithms or rules, it does promise solutions by highlighting and facilitating moral imagination both in the framing of problems (problems are posed in terms of framings from multiple perspectives) and in terms of the generation of solutions (multiple problem-framings help us to visualize new solution horizons).
- See Werhane, 2007 and 2008.

What you will do ...

Module Activities

1. Examine the CSR challenges presented above. Compare the two responses to each challenge.
2. Learn about three models of corporate social responsibility.
3. Develop a fully articulated social contract between business and society. Use this contract to understand the basic CSRs of business corporations.
4. Prepare a Social Impact Analysis on the fictional firm, Burger Man.
5. Prepare for and participate in a board meeting for Burger Man to examine ethically its practices and develop for it a viable and sustainable program of corporate social responsibility. This requires that you give a short presentation on the interests of a particular Burger Man stakeholder
6. Develop a full blown CSR program for Burger Man that carries out the responsibilities of this company to its stakeholders.

Burger Man Stakeholders

The author became aware of the Burger Man exercise when participating in an Ag-Sat broadcast course in Agricultural Ethics in 1992. The exercise was created by the leader of the course, Dr. Paul Thompson.

Burger Man Profile
Burger Man is a franchise that began by selling the fast food staples of hamburgers, french fries, and milk shakes. As the company has matured and faced other competitors in this market niche, it has, of course, developed a more sophisticated set of products and services. But it has also been challenged on various issues related to corporate social responsibility. Groups representing the rights and interests of animals have criticized the agribusiness methods used by its suppliers. Recently, public interest groups have blamed Burger Man and its competitors for encouraging unhealthy dietary habits among its customers and the public in general. Shareholders, of course, are concerned that the company continue to be profitable and provide them with a good return on investment. Governmental regulatory agencies such as the EPA (Environmental Protection Agency) and OSHA (Occupational Safety and Health Administration) wish to hold Burger Man accountable for conforming to its regulations. In short

there are several stakeholder groups surrounding this corporation, each vying for its particular interest. In this exercise, you will play two roles. First you will be assigned a role as one of Burger Man's stakeholders and make a presentation of your group's interest in mock shareholder meeting that will be held in class. Then you will switch to the role of Burger Man management. Here your assignment will be to articulate the different stakeholder interests and integrate them into a coherent CSR plan for your company.

Burger Man Customers

- Burger Man customers are the consumers who go to its restaurant and enjoy its food services. In preparing your board meeting presentation you need to explore Burger Man's social responsibilities to its customers.
- Are these reducible to providing them an enjoyable product at a reasonable price? Or does BM's social responsibilities go beyond this?
- Burger Man has extensive interactions with its suppliers that include meat packing corporations and agri-business concerns. How should Burger Man choose its suppliers? How carefully should it monitor their activities. To what extent is Burger Man responsible for the untoward activities of these groups?
- How responsible is Burger Man for shaping the dietary habits of its customers? Does it bear responsibility for the health problems that its public develops from bad dietary practices?

Burger Man Shareholders

- Burger Man shareholders are investors who have purchased shares of Burger Man's publicly traded stock.
- What are their stakes?
- What are their responsibilities? For example, how closely should shareholders monitor the actions of their agents, i.e., Burger Man's managers? Are shareholders responsible for holding Burger Man to certain standards of corporate social responsibility? What are these standards and how do they stand in relation to the different models of social responsibility?
- Prepare your presentation around these issues. Address shareholder interests (stakes) and responsibilities.

Burger Man Managers

- Burger Man managers are the agents of the shareholders/owners responsible for overseeing the day-to-day operations of the corporation.
- What are the manager's stakes? What role do they play in the different models of social responsibility? (Classical, stakeholder, and alliance views?)
- Agency theory argues that the primary corporate governance problem is overseeing and controlling the actions of managers. How closely should shareholders and their board of directors oversee corporate managers? Are managers self-interested agents or stewards of the corporation?
- What are managerial responsibilities vis a vis corporate social responsibility? Should they uncover illegal actions? Should they implement an audit process that assess the corporation's success in carrying out its social responsibilities? Should these responsibilities go beyond the legal minimum?
- Should managers go beyond the legal minimum in monitoring and carrying out corporate social responsibilities?
- Are corporate managers responsible only to shareholders or do their responsibilities extend to other stakeholders? If the latter, how do they balance conflicting stakes?
- Structure your presentation around outlining managerial stakes and roles. Choose a model of corporate social responsibility and argue for its appropriateness to Burger Man.

Government Regulatory Agencies: OSHA and EPA

- OSHA is in charge of regulating workplace safety. EPA is in charge of setting, monitoring, and enforcing standards concerning the environment. (For example, they establish acceptable air emission and water discharge standards.)
- What are the stakes of government regulatory agencies? What is their role in the context of the Burger Man corporation?
- Write your position paper outlining your group's stakes and roles in the context of establishing Burger Man's corporate social responsibility procedures. What would you recommend? How should you back up or enforce these recommendations?

Animal Rights Activists

- Burger Man serves hamburgers, chicken sandwiches, and dairy products. These involve animals. As animal rights activists, you are concerned with steering Burger Man and its suppliers toward morally acceptable treatment of animals.
- What are your group's stakes in this board meeting? What kind of role should you play?
- State your policy on animal treatment? Is it a position of animal welfare based on utilitarian considerations? (Peter Singer provides such a position.) Is it a deontological position based on the assertion of animal rights that impose correlative duties on humans? (Tom Regan takes this position.) Or should you base your arguments on anthropocentric issues such as human health?
- Write a position paper that responds to these questions for presentation in the Burger Man board meeting.

Town X Committee for Economic Development

- Your town, Town X, has three Burger Man franchises. Representatives from the town council are participating in the board meeting in order to ensure that Burger Man's policies on corporate social responsibility enhance the town's economic welfare and development.
- What are your stakes? What are your roles and responsibilities?
- What kind of services and products do you provide for Burger Man? What benefits do your community draw from Burger Man? How can Burger Man activities and policies promote or demote your town's interests and stakes?
- Develop a position paper for the board meeting that addresses these issues? Pay special attention to the goods and risks that your town exchanges with Burger Man.

Insert paragraph text here.

Exercises in CSR

- Participate in the Burger Man Stakeholder Meeting
- Take your assigned stakeholder group and prepare a short presentation(five minutes maximum) on your stakeholder's interests, rights, needs, and vulnerabilities.
- Listen to the stakeholder presentations from the other groups. Try to avoid a competitive stance. Instead, look for commonalities and shared interests. You may want to form coalitions with one or more of the other groups.
- Switch from the stakeholder role to that of Burger Man management. You are responsible for developing a comprehensive corporate social responsibility program for Burger Man. You job is to integrate the concerns expressed by the stakeholders in their presentation and form your plan around this integration.
- Try to resolve conflicts. If you cannot and are forced to prioritize, then you still must find a way of recognizing and responding to each legitimate stakeholder stake. You may want to refer to the "Ethics of Team Work" module (m13760) to look for time-tested methods for dealing with difficult to reconcile stake. These include setting quotas, negotiating interests, expanding the pie, nonspecific compensation, logrolling, cost-cutting and bridging. You should be able to establish beyond a shadow of a doubt that you have made every attempt to recognize and integrate every legitimate stakeholder stake.

What did you learn?

This module and two others (A Short History of the Corporation and Corporate Governance) are designed to help you understand the corporate context of business. In this section, you should reflect on three questions: (1) What have you learned about the social responsibilities of corporations? (2) What still perplexes you about the social responsibilities of corporations. (3) Do you find one model of CSR better than the others? (4) Can these models of CSR be combined in any way?

Appendix

Rubric for Partial Exam on CSR
https://cnx.org/content/m17318/

This file contains the rubric to be used on the partial exam for Corporate Leadership and Social Responsibility, ADMI 3405, Fall 2008"

Corporate Social Responsibility Frameworks: Seminal Papers

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EAC ToolKit Project

Approaches in Environmental Ethics For Business and Engineering
This module has been developed for students in Business Administration and Engineering. Students learn to integrate ethics into environmental problem-solving by studying different approaches (deontology, utilitarianism, virtue) that take different perspectives (individualistic/holistic, anthropocentric/nonanthropocentric) on real world environmental problems. Three cases taken from Puerto Rico introduce these themes: Super Aqueduct, Windmills, and Gas Pipelines. The characterization of environmental problems as "wicked" comes from Rittel and Weber. Students are given tools for tackling these ill-structured situations that resist more traditional approaches. Ethical approaches in environmental are presented to help uncover the ethical, social, political, economic and ecological dimensions of interdisciplinary environmental problems. Real world cases provide a practical "laboratory" in which students can try out and test problem solving frameworks. Finally, reflective activities and reference materials are provided to help achieve module closure. This module has been developed as part a project funded by the National Science Foundation, "Collaborative Development of Ethics Across the Curriculum Resources and Sharing of Best Practices," NSF-SES-0551779.

Note: This section provides a brief description of the links provided by this module. These sources are designed to suppliment the material provided in this module and to help you navigate the resources displayed on the internet to find materials of value in environmental ehtics.

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- The Zoe Colocotroni was an oil tanker that became grounded
on a reef off the southwest coast of Puerto Rico.  This led to
a famous legal decision and a creative solution to the problem
of determining damages to the environment.

- Ethics Updates links to a wealth of online materials related to
environmental ethics.  Many of these can also be found at the
North Texas University website.
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Word Version of this Template
https://cnx.org/content/m32584/

This is an example of an embedded link. (Go to "Files" tab to delete this file and replace it with your own files.)

Cases

These cases touch on environmental problems in the Puerto Rican context. To respond, begin with a socio-technical analysis of Puerto Rico. To help, please look at http://cnx.org/content/m14025/latest/.

You will find an STS table toward the end of the module in the form of a media file. Click on this file to open tables that describe Puerto Rico in the context of engineering and energy generation.

Super Aqueduct

- In the 1990's, the San Juan Metro Area suffered chronic water shortages during the summer months. High demand in the Metro Area (which covers about one third of Puerto Rico) coupled with less rain in the summer months was one cause. Decaying and neglected water infrastructure (leaky water lines, illegal taps into the water supply, and silt-filled reservoirs whose water storage capacity had been drastically reduced), high temperatures, and less rain provided the other causes.
- During the late 1990's, government and water officials debated different options for resolving the problem. First, they imposed a rationing system where water was turned off except for short periods in the morning and evening. This discouraged nonessential uses such as watering lawns and filling swimming pools, but rationing proved unpopular and failed to address the broader, underlying causes.
- Another solution emerged based on moving water from other parts of the island where supply was plentiful and population sparse to the areas of scarcity. Called the Super Aqueduct, this pipeline would transport water from the Rio Grande south of Arcecibo to San Juan and surrounding communities. Objections to the super aqueduct focused around environmental and safety concerns.
- First, taking water from the Rio Grande would reduce the amount of fresh water that flowed into the Arecibo estuary, an ecosystem that emerged where the fresh water of the Rio Grande flowed into the salt water of the Atlantic Ocean. Reducing the flow of fresh water into the estuary would harm the estuary. Moreover, it would accelerate the draining of Puerto Rico's main aquifer located in the north under the limestone hills that form what is called the Karst region. Highway construction, individual wells and the general decline of the rivers that deliver fresh water to the Atlantic have all drained fresh water from this aquifer which has been replaced by salt water drawn in from the Atlantic.
- Opposition to the Super Aqueduct also raised safety concerns. The aqueduct was designed to deliver up to 100 million gallons of water per day to the San Juan area. This made it essential to design and construct pipes that could contain water running through it at such high pressures. Moreover, it required careful planning in locating the pipeline to make sure that avoided densely populated areas. To dramatize this, a section of pipeline burst during a routine test causing considerable property damage. Fortunately, nobody was at home when a river of water inundated several houses sweeping away heavy appliances such as washing machines, refrigerators, and stoves.
- The Super Aqueduct was constructed and activated in 2002. It is now transporting water to the Metro Area and the chronic water shortages in the summer have stopped.

Windmills

- Kristin Shrader-Frachette classifies energy generation technologies as following either hard or soft paths. (She attributes this distinction to Amory Lovins.) "The hard path is centralized, capital intensive, large scale, complex, and energy intensive." On the other hand, "the soft path is characterized by decentralization, smaller capital investments, small-scale organizational structures, and less complex, labor-intensive technologies."
- The windmill project, currently under debate in Puerto Rico, seems to have a foot in each. In its earlier phases, windmill technology walked on the soft path with decentralized ownership, small scale operation, low capital investment, and simple design. But the plan set forth by a private

company to build a windmill farm in Puerto Rico has been met with local opposition that seeks to locate it on the hard path.

- The windmills are to be built on a plot of land adjacent to the Dry Forest of Guanica, a fragile nature preserve under the protection of the United Nations and the Puerto Rican government. Some fear that the windmills would kill birds from the many endangered species that have sought refuge in the preserve.
- Others are concerned that the company proposing to build the windmill farm cannot be trusted to remain focused on windmill technology; they fear it will be used as an excuse to industrialize the Guanica/Ensenada areas with harmful environmental and social impacts. Industrialization would disrupt a way of life for residents that dates back to the sugarcane plantations that operated until the early 1970's.
- The public hearings carried out on the project by the Puerto Rican government were poorly publicized and held in an exclusive resort complex located on the far side of the island, a good day's drive from the Dry Forest of Guanica. Those already concerned about the environmental impact of the windmill project, now added concerns about their rights of participation and social justice.
- "What," they ask, "are public officials trying to hide?"

Gas Pipelines

- Puerto Rico depends almost entirely on petroleum to fuel the plants that produce the island's electricity. In 1992, a project developed by the private company, Cogentrix, to produce electricity and sell steam as a byproduct using cheap and widely available coal was defeated by groups in the Mayaguez area concerned by the plant's environmental impacts. Both the proponents of the plant and the electric authority predicted chronic shortages and black outs by the turn of the century. These predictions have turned out to be true.
- Moreover, the environmental impact of the oil-dependent generating plants combined with the instability of the world oil market has brought the energy crises to Puerto Rico. The EPA has ordered the Puerto Rico energy authority, called the **Autoridad de Energía Eléctrica (AEE)**, to reduce its dependence on oil for the production of electricity to below 50% by the year 2010.
- To comply, the AEE has turned to natural gas and has begun the construction of a pipeline from the coastal region near Penuelas to electricity plants on the other side of Ponce. The technology surrounding natural gas is sound, safe, and clean. But the location of the pipeline and the environmental and social impact of its construction has caused damage in largely poor communities.
- Residents interviewed state that they were not properly informed that the pipeline would be situated so close to their homes or that the construction would have such a grave impact. They claimed that they were not able to participate in the public hearings held on the pipeline and have been forced to bear an unjust burden of its social and environmental costs.
- Does the use of natural gas delivered to electricity generating plants by means of underground pipelines represent good, sustainable environmental decision-making?
- What should the AEE and the Puerto Rican governmental officials have done differently to anticipate better the social justice concerns of those living near the construction sites of the pipelines?

Introduction

- In this module you will learn about the different approaches to environmental ethics. A table will summarize and classify the different approaches that have dominated the discussion for the last

thirty years. These include extensionism, environmental virtue ethics, ecocentrism, biocentrism, and the land ethic.

- Another table will help you to analyze problems in terms of the priority of basic over non-basic interests and human versus non-human interests. This will help break the habits we have of automically favoring human over non-human interests when making environmental decisions.
- Byron Norton provides a Pragmatic approach to the environment that makes use of his considerable experience inside the Environmental Protection Agency. You will use a framework here that summarizes the different principles/values that he uses to define "sustainability."
- Forming the background of environmental decision-making are basic concepts and procedures outlines in the discipline of ecology. This module will provide some basic definitions of ecological concepts like ecosystems. It will also outline some of the intellectual history of environmentalism by sketching different approaches to ecology as set forth by historical figures like Clements, Gleason, and Tansley.
- Finally, an exercise section will help you integrate and practice these frameworks and concepts in the cases discussed above. When you finish this module, you will have a fuller, richer standpoint from which to make environmental decisions in the occupational and professional contexts.

What you need to know …

Environmental Concepts

- **Ecosystems**: "Ecosystems--forests, wetlands, lakes, grasslands, deserts--are areas in which a variety of living organisms interacting in mutually beneficial ways with their living and nonliving environments."(Des Jardins, 166)
- **Ecosystems**: "Ecosystems are self-organizing systems that unfold on many scales and at many speeds; indeed, ecosystems exist on all scales from microhabitat to eco-region, so it is apparently irrelevant to ecological risks to identify at-risk individuls and count risks to them. (Norton, 9)
- **Characteristics of Ecosystems**: (1) Boundaries serve to separate and distinguish ecosystems. These boundaries are porous, and ecosystems interact with one another. (2)Niches provide organisms within ecosystems with roles and associated activities. These niches organize organisms and their activities. Then the niches, themselves, are coordinated and interact within the overall ecosystem. (3) Succession characterizes the tendency of ecosystems toward internal and external dynamic integrity. Internally, the activities of organisms within a niche are coordinated with one another, and theses niches, themselves, interact according to stable patterns. In the past ecosystems evolved by passing through a succession of intermediate states toward a climactic stage characterized by internal and external equilibrium. This climax phase represents the ecosystem in its most mature phase.
- **Evolution**: Charles Darwin "discovered" the theory of evolution and set forth its basic elements in his monumental work, "The Origin of Species." (1) The main thesis of evolution is that species, themselves, change, evolving in response to changes in the surrounding environment. (2) The main principle guiding the evolution of species is natural selection. Randomly produced variations embodied in the individuals that populate a species are, for the most part, not that important to survival. But occasionally a variation gives an individual a survival advantage that is perpetuated through this individual's increased ability to pass on these characteristics through reproduction. In this way, the surrounding environment filters out most random variations in individuals, allowing only those that provide a competitive advantage to be passed on. Over time, this leads to changes in the species itself. (3) Darwinism is important to environmental ethics because it provides a broader framework in which to understand the impact of human

activities on the surrounding natural environment. Darwinism conveys both how dynamic the natural environment is and also how susceptible it is to the impact of human activities.

History of Ecology

- Phase I—Clements: "Nature's course … is not an aimless wandering to and fro but a steady flow toward stability that can be exactly plotted by the scientist. In any given habitat there occurs a clear progression through what Clements termed a "sere," a system of developmental stages that begins with a primitive, inherently unbalanced plant assemblage and ends with a complex formation in a relatively permanent equilibrium." Worster, EN, 210 "the unit of vegetation, the climax formatin, is an organic entity. As an organism, the formation arises, grows, matures and dies….The climax formation is the adult organism, the fully developed community, of which all initial and medial stages are but stages of development. Succession is the process of the reproduction nof a formation, and this reproductive process can no more fail to terminate in the adult form in vegetation than it can in the case of the individual." (Clements quoted by Worster, EN, 211)
- Phase II—Gleason and Individualism: The Individualistic Concept of Plant Association. Ecosystems are not organisms. They do not form associations but "mere accidental groupings." Hence, Gleason criticizes the notion of ecosystems working toward a climax state. Worster, EN, 238
- Phase III—Tansley and Individualism: Tansley rejected the "monoclimax" views of Clements. He also felt that it was wrong to define the climax state of ecosystems indepedntly of human influence. "Anthropogenic" climax: "biological system that is artificially created by humans but is as stable and balanced as Clements' primeval climax." Worster 240. Tansley sees ecosystems as physical systems. Ecosystems are arenas in which an exchange of energy and chemicals takes place. This allows for ecosystems to be treated analogously to electricity and using field theory in physics and its associated mathematical models. This also allows for ecology to move from methodological holism to methodological individualism: the behavior of the ecosystem is reducible to the sum total of the behavior of its parts

Approach	Description	Method	Proponents	Leading Questions, Values, and Virtues
Non-Anthropocentric Holism	**Land Ethic**: A thing has value or is good insofar as it promotes the integrity, stability, and beauty of the biotic community.	Focus of analysis and study is on ecosystem as a whole	Sessions (Deep Ecology); Aldo Leopold according to Baird Callicott's reading	(1) **Respect for Biotic Communities** (2) **Prudence**: "the midpoint between 'a mad rush into oblivion' and an 'intransigent do-

	Biotic community includes humans, non-humans, species, and ecosystems all interacting as a system.			nothingness'" (3) **Practical wisdom or judgment**: "showing 'sensitivity' to ecological communities and their members and sorting out the rival claims and interests within and among communities." See Shaw, "Aldo Leopold's Land Ethic
Non-Anthropocentric Individualism	**Biocentrism**: This approach attributes moral consideration to all living things. It is based on respecting all "teleological centers of a life."	Individual living things are focus of analysis. Objective is to find the telos or life-directing goal of each living individual.	Paul Taylor; John Rodman; Albert Schweitzer	(1) Find, through sympathetic imagination, an individual's "teleological center of a life, i.e., its proper good. (2) Respect it by refraining from interferring with it and promoting the circumstances its needs to realize its end (=telos)
Anthropocentric Holism	**Virtue Environmental Ethics**: Approach centers on virtues as habits that promote sustainable transactions with the natural		Rosalind Hursthouse; Sandler/Cafaro et. al.	(1) **Virtues of Position**: "Constructive habits of seeing ourselves in a particular place in a relational structure and interacting accordingly.

	environment. Hursthouse provides a provocative example with the virtue, respect for nature.			(2) **Virtues of Care**: "habits of constructive involvement within the relational structure where we have found our place. How widely do we cast our sensors in order to learn what is needed around us?" (3) **Virtues of Attunement**: "habits of handling temptations by adjusting our positive, outgoing drives and emotions to match our chosen place and degree of constructive, ecosocial engagement." (4) **Virtues of Endurance**: "habits of facing dangers and difficulties by handling our negative, protective drives and emotions in such a way that we can sustain our chosen sense of place and degree of constructive ecosocial engagement." Wensveen, 176-177

Anthropocentric Individualism	**Extensionism**: (1) Moral value is extended ot individuals via sentiency, i.e., their capacity to suffer. (2) Moral rights are extended to individuals via preference autonomy, i.e., having desires and the capacity to act on them.		Peter Singer (Animal Liberation); Tom Regan (Animal Rights)	(1) **Extending Utilitarianism**: (a) What are the sentient creatures involved? (b) What impacts do our actions have on them? (c) What is the overall balance of benefits and harms? Does this balance maximize utility? (2) **Extending Deontology**: (a) What/who are the moral patients involved? (b) What are their rights? (c) Does the proposed action violate any of these rights? (d) Who speaks for these moral patients?

Table One: Outline of ethical approaches to environmental problem-solving

Deep Ecology Platform (Naess and Sessions)

1. The flourishing of human and nonhuman life on earth has intrinsic value. The value of nonhuman life-forms is independent of the usefulness these may have for narrow human purposes.
2. Richness and diversity of life-forms are values in themselves and contribute to the flourishing of human and nonhuman life on earth.
3. Humans have no right to reduce this richness and diversity except to satisfy vital needs.
4. Present human interference with the nonhuman world is excessive, and the situation is rapidly worsening.
5. The flourishing of human life and cultures is compatible with a substantial decrease of the human population. The flourishing of nonhuman life requires such a decrease.
6. Significant change of life conditions for the better requires change in policies. These affect basic economic, technological, and ideological structures.

7. The ideological change is mainly that of appreciating **life quality** (dwelling in situations of intrinsic value) rather than adhering to a high standard of living. there will be a profound awareness of the difference between big and great.
8. Those who subscribe to the foregoing points have an obligation directly or indirectly to participate in the attempt to implement the necessary changes. This Deep Ecology Platform was developed by Naess and Sessions and quoted in Des Jardins, p. 217.

Human Goods/Non-Human Goods	Basic Non-Human Good	Non-Basic, Non-Human Good
Basic Human Good	Basic human good has priority because of right of survival. (Humans need to clear wilderness to grow food)	Basic human good has priority because a basic good has priority over a non basic good. Cutting back branches on a tree to prevent them from breaking off and killing school children
Non-Basic Human Good	The basic, non-human good has priority because a basic good has priority over a non-basic good. Ex: I ought not cut down my trees to pave over my backyard and park my car.	Toss-up. Some non-basic goods have priority over others. I may, for example, have the right to deprive a non-human of some good in order to preserve an important (but not basic) cultural or historical good.

Conflicts Between Goods: A Schema for their Analysis and ResolutionTrade offs between human and non-human, basic and non-basic goods.

Notes on Table Two

- Sacrificing one good for another is always a last resort. This requires that you do the following first:
- That you have first looked hard for ways to harmonize or integrate the conflicting goods. Chances are, you can design a value-integrating solution.
- That the conflict between goods can only be resolved by the sacrifice of one to the other.
- That if you do--as a last resort--find it necessary to sacrifice one good, that you find a way to offset this. For example, AES planted trees in Costa Rica to sequester the carbon that it produced in its co-generation plants in the US.
- That the sacrifice of the basic non-human good be only for the short term. That preventive measures be taken now to prevent such a sacrifice in the future.

Norton's Approach to Environmental Problem-Solving

Wicked Problems

- Norton, drawing from Webber and Rittel, characterizes environmental problems as "wicked." This may not be the most felicitous choice of works since declaring problems wicked seems to place them beyond solution. But wicked can be spelled out to show that environmental problems are solvable but require a different, more social and interdisciplinary approach.
- Wicked problems are difficult to formulate because they cover "ill-structured" situations. Specifying them requires the exercise of the structuring capacities of imagination. And it requires recognition that these problems can be brought to determination in different ways.
- Wicked problems are not numerical problems. (Non-computability) They have components or regions that admit of quantification but, as a whole, resist quantification. This requires that environmental problem-solvers go beyond economic and quantitative ecological methods.
- Wicked problems are non-repeatable. This is, perhaps, an indirect way of saying that they are context bound. Because the context shifts from situation to situation, what works in one situation must be reconstructed to fit the specific content of a different, new situation. We learn from the past but the past must be modified to fit the context of the present and future.
- Both wicked problems and their solutions are open-ended. We can distinguish between good and bad problem specifications and good and bad solutions. But there is no uniquely correct problem formulation and there is no uniquely correct solutions. Pragmatists argue that this is due to fallibilism (our efforts to reach the truth always fall short) and experimentalism (our solutions must be tested in the crucible of experience).
- Finally, wicked problems must be approached from an interdisciplinary standpoint. They present economical, ecological, social, and ethical dimensions that must be integrated in the problem-solving process. This is, decidedly not multidisciplinary where the disciplines are present alongside one another but do not interact. In environmental problem-solving these disciplines much engage and challenge one another, work to formulate common problems, and design solutions that integrate the different disciplinary concerns and aims.

Norton's Sustainability Values

- **Community Procedural Values**: These are values (reciprocity, publicity, and accountability) that, when adopted by a community, help it to structure a fair and open community deliberative process.
- **Economic Values**: Economic goods emerge from actual and hypothetical values. (1) Willingness-to-Pay: the instrumental value of a resource is set by the price an individual or group would be willing to pay to acquire the resource; (2) Willingness -to-Sell: because WTP undervalues resources (it ties value to the constraint of disposable income) a more accurate measure of value would be the amount that an individual or group would accept from a bidder to take the resource out of its current use and put it to a different one.
- **Risk Avoidance Values**: Precautionary Principle--"in situations of high risk and high uncertainty, always choose the lowest-risk option." 238
- **Risk Avoidance Values**: Safe Minimum Standard of Conservation--"save the resource, provided the costs of doing so are bearable."348.
- **Values Central to Community's Identity**: Justice, integrity, trust, responsibility, and respect can apply here but they should be taken in their thick as well as thin senses. These values, in their thick sense, depend on the quality of the discourse generated within the community.

What you will do ...

Exercise One: How Much is El Yunque Worth?

- Assume a developer is interested in purchasing El Yunque (the only tropical national park in the United States) for the purpose of turning it into qa recreation center. They have made their bid. A referendum has been announced where the Puerto Rican people can try collectively to out-bid this developer. Please indicate below the maximum amount you would pay each year to keep El Yunque in its present condition.
- El Yunque has just been purchased by Mega Entertainment, a huge, multi-national, mass media and entertainment park conglomerate. They plan on cutting down all the tropical stuff and replacing it with a recreation center, amusement parks, a theme park, several gourmet theme restaurants, a high end shopping mall, and a hotel-resort complex. You consider spending your honeymoon in the new Mega Entertainment El Yunque resort complex. The following are reasonable rates for a week-long stay in a resort complex. How much would you be willing to pay? (a) below $500. (b)$500-$1000. (c)$500-$1000. (d) More than $2000. (Assume these prices are competitive with other, high scale resort complexes.
- If the amount that you are willing to pay in #2 is greater than what you would be willing to pay in #1, does this mean that you value the Mega Entertainment El Yunque recreation complex more than the El Yunque National Park? Explain your answer.
- Now, assume that you as a Puerto Rican jointly own El Yunque as a national treasure. How much would Mega Entertainment have to pay you (and other Puerto Ricans) for you to become "willing to sell" El Yunque? What, in other words, is your selling price?.
- Compare your selling price with your paying price for El Yunque. What factors constrain what you are willing to pay? What considerations influence the price at which you are willing to sell?

Exercise Two: Super Aqueduct

- The Super Aqueduct provides an interesting test for a conflict between basic human and non-human goods. Having affordable drinking water is a basic good for humans. However, is it necessary to sacrifice the estuary from which the Super Aqueduct pumps water in order to serve the water needs of the San Juan Metro area?
- Several questions have to be answered
- How much water must be pumped out of the Arecibo estuary?
- Is the Super Aqueduct the only means by which safe drinking water can be delivered to the San Juan Metro area?
- Have other measures like conservation been tried and thoroughly tested?
- Can the water shortages in San Juan be addressed by other partial solutions like repairing and up-dating infrastructure?
- Are technical solutions like desalinization viable in the short and long term?

Exercise Three: Windmills and Environmental Virtues

- Louke Van Wensveen identifies four virtue groups for environmental ethics. These consists of virtues of (1) Position, (2) Care, (3) Attunement, and (4) Endurance.
- If the windmill project were carried out in accordance with these virtues would it be a moral imperative to go ahead with the project?
- How would these virtues guide the design, construction, and operation of a windmill farm?
- Who would carry out the project? What would the role of the government be? What would the role of the local commmunity be?

Exercise Four: Land Ethic and Oil Refineries

- Examine the oil refinery in Catano, Puerto Rico in terms of the four virtues Shaw attributes to Leopold's Land Ethic
- How does the project stand in relation to the virtue of **Respect for the Biotic Community**?
- How does the project stand in relation to the virtue of **Prudence**?
- How does the project stand in relation to the virtue of **Practical Wisdom or Judgment**?

"Do Not Feed the Bears?"

- Last February, in the middle of a cold morning, a bison bull plunged through the ice-covered Yellowstone River near Fishing Bridge in the center of the park and was unable to extricate himself. Water vapor steaming from its nostrils in the crisp air, the 2,000 pound animal struggled in vain, succeeding only in enlarging the hole. About 10:30 a.m. park employee Barbara Seaquist, a member of the young Adult Conversation Corps, discovered the drowning bison and contacted park headquarters. A park ranger replied that the incident was a natural occurrence, and the bison should be allowed to sink or swim on its own. Meanwhile, several persons who had heard about the struggling beast appeared on the scene to photograph it.
- By about 5:00 p.m., as dusk was settling on the bison's struggle for life, a party of nine snowmobilers approached the bridge. After learning from Seaquist that assisting the buffalo was against park policy, one of the snowmobilers, Glenn Nielson, a vice president of Husky Oil Company from Cody, Wyoming, became outraged. He was struck by what appeared to be the callous attitude of the photographers, who were merely filming the incident. "If you're not going to help it," Nielson said, "then why don't you put it out of its misery?"
- The sowmobilers left the scene, and after a brief caucus four of them returned, Nielson carrying a sixty-foot orange nylon rope. Seaquist was gone when they returned, so they fashioned a loop, tied it around the animal's horns, and walking gingerly out on the ice, tried to haul the animal to safety. At this point Seaquist returned and repeated her request that nature be allowed to prevail. She also warned the four men that they were endangering their own lives by walking out onto the ice. They ignored her. According to Nielson the bison had almost make it out of the water when the rope broke. "The sad thing," he said, "is that he [the bison] knew we were trying to help. He laid his head at my feet just exhausted." As it grew too dark for the rescuers to see, the attempt was abandoned. The temperature fell to -20F that night. In the morning the bison was dead, frozen into the ice. Coyotes and ravens soon descended on the animal. When the warmth of spring melted the river and freed the remainder of the carcass, a grizzly bear was observed feeding on the bison downstream. A shred of orange nylon rope was still fastened to its horns.
- Upon his return to Cody, Nielson wrote a letter to the right-wing radio commentator Paul Harvey, describing what he felt was the Park Service's cruelty. Harvey seized on the dramatic incident and, in three venom-filled broadcasts, tore into the Part Service's policy of nonintervention, calling officials "knee-jerk ecologists." "It is not a scientific question, it is a moral one," Harvey said. "The reason Jesus came to earth was to keep nature from taking its course." By J. Robbins quoted in Stone, 157-8.

Exercise Five: Should the Bison Be Saved?

- If you were there, would you join Nielson in attempting to save the bear?
- Choose an ethical approach from above that best supports the Park Service's position of nonintervention and construct an ethical argument in its support.
- Choose an ethical approach from above that best supports the position of intervention and construct an ethical argument in its support.
- Is Harvey right when he claims that the Park Service assumes this a scientific issue when in fact it is a moral/religious issue? Is nonintervention clearly the position that must be derived from the

ecological standpoint?

Exercise Six: Stop Having Babies

- The platform of Deep Ecology uses the position that nature is intrinsically valuable to assert that human population must be drastically curtained.
- Examine the claim that nature is intrinsically valuable, that is, it has value on its own independently of its usefulness as a resource to serve human needs.
- Examine the additional premise that human activity is "excessive and the situation is rapidly worsening."
- Do you think that human population should be seriously curtailed to mitigate or eliminate the harmful impact of human activity on the environment?
- Norton would hold that the Deep Ecology platform is decidedly nonanthropocentric. Do you agree? Can, as Norton claims, a sustainable environmental policy be carried out on anthropocentric grounds?

What did you learn?

Take time to do a Muddy Point exercise on this module. What did you learn? (Something positive.) What was the muddiest point? (Something you didn't understand or disagreed with.)

Presentation on Module

https://cnx.org/content/m32584/

Presentation on Environmental Ethics With Exercises
https://cnx.org/content/m32584/

Presentation at Schoenstatt January 22, 2010
https://cnx.org/content/m32584/

Presentation Taped October 30, 2011 at Schoenstatt
https://cnx.org/content/m32584/

Appendix

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EAC ToolKit Project

This module is a WORK-IN-PROGRESS; the author(s) may update the content as needed. Others are welcome to use this module or create a new derived module. You can COLLABORATE to improve this module by providing suggestions and/or feedback on your experiences with this module.

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Writing and Analyzing Ethics Cases in Business and Research Ethics
Caution: this module is still under development. This student module is designed to help students write and analyze ethics cases in business and research ethics. It provides a short taxonomy of ethics cases, tips on identifying and writing cases, and a four-step framework for analyzing them. Converging, interdisciplinary research shows that identifying, developing, and studying ethics cases strengthens decision making and enables a concrete, "thick" understanding of basic and intermediate moral concepts. This module is being developed as a part of a project funded by the National Science Foundation, "Collaborative Development of Ethics Across the Curriculum Resources and Sharing of Best Practices," NSF-SES-0551779. It makes full use of the student module template developed in conjunction with this project.

Outline of contents of featured links in Online Ethics, UPRM-Ce-PRO, Computing Cases, and Connexions

- Computing Cases has experimented with a method for displaying a case that takes advantage of online features such as hyperlinking. The three cases featured (Therac-25, Hughes Aircraft, and Machado) provide excellent templates for developing your own case. They, typically, provide an abstract, case narrative, socio-technical system analysis, supporting document, perspective pieces, and short ethical discussions. The focus is on computer ethics.
- Online Ethics provides a wide variety of cases. Of special interest are the cases developed by graduate students that reflect their experiences in research ethics. These cases normally provide the case narrative, a commentary written by the graduate student who is the author of the case, and a commentary by one or more of the ethicists participating in the graduate research ethics workshop held through the auspices of the Association for Practical and Professional Ethics.
- Adopt an orphan. The University of Puerto Rico - Mayaguez Center for Ethics in the Professions has a number of case drafts displayed at its website. These come from faculty development workshops or from students who have developed cases in ethics workshops and classes. These provide only the bare narrative. Your group may choose to adopt an orphan by taking one of these narratives and building upon it

through a socio-technical analysis or through links to supporting information online. These cases represent issues vital to students and instructors in business, science, and engineering. Developing one into a full blown case study would represent an excellent investment of your time.

- The National Society of Professional Engineers publishes cases that have been brought to and discussed by its Board of Ethical Review. The NSPE BER cases go all the way back to the 1960's and provide invaluable insights into how engineers interpret and use their codes of ethics. Each case has a summary, a question to be answered by the BER's deliberations, a list of relevant code provisions, a discussion of the case in terms of these provisions and a concluding decision. Occasionally, the BER does not reach complete agreement on cases and publishes a minority decision. Your group could adopt a BER case to this assignment by completing its research, identifying key decision points, and providing an analysis of the case's underlying socio-technical system.
- Finally, two Connexions modules devoted to the Biomatrix and Toysmart cases provides tables and templates to help you along on the process of analyzing your case. They set forth exercises and tables designed to help you work through the four stages of problem-solving based on an analogy between ethics and design problems. These are (1) problem specification, (2) solution generation, (3) solution testing, and (4) solution implementation.

Introduction

Learning Basic and Intermediate Moral Concepts

- Below is a media file that provides a summary of the basic and intermediate moral concepts that play a key role in business and engineering ethics. (Many of them also apply to research ethics.) This summary, in table form, will help you in forming your case. Which concepts arise in the case you are considering? Can you reform or rewrite the case to bring out other concepts?
- Examples of **Basic Moral Concepts**: Rights, Duties, Goods, and Virtues.

- Examples of **Intermediate Moral Concepts**: Conflict of Interest, Confidentiality, Free Speech, Informed Consent, Privacy, Intellectual Property, etc.
- Cases provide an excellent way of learning how these basic and intermediate moral concepts fit into the real world.

This module is designed to help you learn ethics by preparing and analyzing ethics cases.

- Discussing cases will help you learn about basic and intermediate moral concepts. Studying several cases helps you develop a repertoire of examples of different degrees and kinds of instantiations of these concepts in real situations. Discussing these cases and comparing them to one another helps you to develop paradigmatic examples of the concepts and then understand more problematic instances by establishing their relations to the paradigms through analogical reasoning. This process, called by some "prototyping" more accurately reflects the way we understand and use these thick concepts than does the process of formally defining them in terms of necessary and sufficient conditions. (See Michael Pritchard, **Reasonable Children**, and Mark Johnson, **Moral Imagination**. For a clear and useful explanation of relating problematic cases to paradigms (what they call "line drawing problems"), see Harris, Pritchard, and Rabins, **Engineering Ethics: Concepts and Cases** (2000) Wadsworth: 45-52.
- Cases provide the means of converting the freestanding ethics course into an ethics laboratory where you practice decision-making under conditions that mirror real world situations to the greatest degree possible.
- By helping us to develop cases, you keep our ethics program, in all its aspects, as up to date and relevant as possible. Many of these cases will be integrated into the College of Business Administration Ethics Bowl competition.

In this module you will carry out the following activities:

- Study and respond to a taxonomy that spells out different types of ethics cases.

- Receive advice on how to choose, prepare, write, and analyze your case.
- Study different templates for writing and analyzing your case. For example, the template (=procedures) for developing cases used by Dr. Huff at the Computing Cases website provides an excellent model for developing historical, thick cases. Dr. Huff places the development of a socio-technical system analysis at the center of his case writing and analyzing method.
- You will receive advice on how to develop a poster presentation on your case study and your analysis.

What you need to know …

Michael Davis in Ethics and the University (1999) Routledge: 143-174 provides a comprehensive discussion of how the field of practical and professional ethics employs the case study method of teaching.

- He discusses how law schools began to use discussion of legal decisions (law cases) to teach the law.
- Professors presented these cases using the "Socratic Method" or what has also been termed as "testing to destruction." Aggressive questioning is used to get students accustomed to the pressures of making a legal argument in an adversarial context in court. The Socratic Method has never been successfully used in teaching business because questions are not used by managers as weapons in a legal context but as means for gathering the information necessary for making informed decisions.
- Davis also discusses how the Harvard Business School adopted the legal model of teaching by case discussion but quickly changed this methodology to reflect better the underlying dynamics of the business situation.
- Philosophers have also used cases to clarify, rhetorically support, or advance a position in a philosophical controversy. Deciding whether to keep the promise you made to the village chief (on his deathbed) to use his inheritance to build a statute of him or to buy the village children much needed shoes helps to point out ethical conflicts and to advance a theory as a more effective way of addressing these conflicts. The

dilemma that Jim in the Jungle faces (made famous by Bernard Williams) that is portrayed in the Mountain Terrorist module also provides an example of this kind of puzzle case.

- Ethics cases began to emerge when physicians brought practical and difficult decisions raising ethical issues to philosophical ethicists for discussion and counsel. These case have also undergone different transformations as they have been used to promote learning and discussion in the different areas of practical and professional ethics.

This quote from Donaldson and Gini also provides insight into how the case study method was first imported into business teaching.
"What is known today as the case study method began at Harvard University in 1908 with the opening of the new business school. The business school's first catalog stated that the "problem method" would be utilized "as far as practicable." After years of struggle and experimentation, the case method reached maturity at Harvard from 1919 to 1942 under the encouragement of the deal of the business school, Wallace Donham. It was during these years that the method became the trademark of the Harvard Business School, a position it retains to this day." Thomas Donaldson and Al Gini, Case Studies in Business, 4th Ed. New Jersey: Prentice Hall, 1996: 12.

Michael Davis in **Ethics and the University** also provides an excellent case taxonomy. Below are the sixteen distinctions he uses to classify cases. It is best to think of this taxonomy, not as a static matrix within which we slot a case, but as a set of specifications and constraints we can use to design or modify cases to fit our needs and purposes.

1. **Long (and very long) v. short (and very short)**
2. **Documents (or pseudo-documents) v. summary**
3. **Single perspective v. several perspectives**
4. **Narrative v. dialogue**
5. **Pure fact v. descriptive commentary**
6. **Realistic (hypothetical) v. real (actual)**
7. **Stories v. problems**
8. **You (agent) v. they (judge)**
9. **Would v. should**

10. **Top v. bottom**
11. **Success (the positive) v. failure (the negative)**
12. **Single issue (poor) v. multi-issue (rich)**
13. **Single stage v. multi-stage**
14. **Ordinary v. technical language**
15. **Personal v. policy**
16. **Living v. frozen**

Case Taxonomy (Taken from Huff and Frey)

- **Thick vs. Thin Cases**: Thin cases are useful for abstracting a single point and focusing work on that point. Thick cases can give the student practice in making ethical decisions in the full context of the messy real world.
- **Historical vs. Hypothetical**: Historical cases are based on actual experience in the field. The Therac-25, Ford Pinto, Hughes Aircraft, and Machado cases are all historical. these provide the sort of excitement and immediate relevance that help students to recognize the importance of ethical enquiry. On the other hand, cases that are hypothetical, fictional, or abstract remove much of the impact of the historical case, though they allow the case writer the freedom to structure, abstract and focus the discussion on precisely the issues of concern. Harvard Business cases are generally thick and historical. Useful--in fact excellent--for in-depth study, they present difficulties for those interested in directing shorter activities.
- **Good vs. Bad News cases**: The tendency in ethics cases is to have only bad news cases in which some bad outcome occurs because of poor choices. These cautionary tales do grab students' imaginations but the asymmetrical emphasis on bad news gives the impression that good--or even decent--action is impossible, rare, and heroic. Bad news cases should be balanced with cases of morally exemplary scientists and engineers as well as with good choices toward good outcomes made by ordinary scientists and engineers.
- **Big vs. Small News Cases**: Bad news cases are frequently big news cases; bad news is more sensational and often more newsworthy. Bad news cases are also rare events which make them big news. But these cases frequently present students with a spectacle which, while

interesting, precludes involvement. On the other hand, small news cases are about the everyday decisions that scientists and engineers make in the way they handle reporting, data collection , process management, personnel and other day-to-day issues. So big news cases are more sensational and exciting; little news cases are more appropriate to the day-to-day ethical situations that students are likely to face.

- From Huff, C. W. and Frey, W. (2005) "Moral pedagogy and practical ethics" **Science and Engineering Ethics** Vol. 11, 1-20.)

The following table compares and contrasts participant vs. evaluator cases. In general, the difference comes down to this: participant cases are excellent for practicing decision-making while evaluator cases do an excellent job of teaching students how to apply ethical theory.

Participant	**Evaluator**
Student takes on the role of one of the participants and makes a decision from that perspective	Student takes up a standpoint from outside the case and evaluates the participants and their deeds.
Helps students to practice integrating ethical considerations into designing and implementing solutions to real world problems.	Useful for introducing and practicing different ethical principles and concepts
Allows students to practice making decision under real world constraints such as lack of knowledge and lack of time.	Useful for introducing and practicing different ethical principles and concepts.

Participant vs. Evaluator Cases

What you will do...

Choosing Your Case

- Tie your case to areas that interest you and tie directly to your research.
- Chose narratives that raise an ethical issue such as how to mitigate or prevent harm, how to resolve value conflicts, how to balance and respect different stakeholder rights, how to balance out conflicting elements of a socio-technical system, and how to transform a dysfunctional organization into an ethical organization.
- Choose a case that can be built out of readily accessible information. Looking carefully at the case's socio-technical system can help you identify and assess information needs.
- Your case should interest and engage you. You and your group should find preparing it a good investment of your time, energy, and expertise.

Structuring Your Case

- **Abstract**: Begin your case with a short paragraph that summarizes or outlines the narrative events. It should draw the reader in.
- **Historical Narrative**: Here, in about 5 to 10 pages, you should detail the "story" of your case. Elements in a narrative or story include a beginning, middle, and end. Protagonists or main characters confront difficulties or obstacles. (This is called the agon in Greek.) At the end of your case, the reader should be clear about how successful the protagonist dealt with the agon and the antagonists.
- **Socio-Technical Analysis** The case narrative unfolds in a particular context called a socio-technical system. Identify the components of your case's STS. Generally these include hardware, software, physical surroundings, stakeholders, procedures, laws, and information systems. Summarize your STS in a table. Then unpack it in a detailed analysis. Frequently, you will find the conflict in your case's narrative in the form of conflicts between values embedded in the STS.

- **Participant Perspectives**: If you were detailing the Enron case, you would identify a key decision point and then weave a mini-narrative around it. For example, an important moment occurred when Enron decided to implement mark-to-market accounting. Invent a dialogue where this was discussed and reenact the reasons the eventually led to the decision.
- **Ethical Perspective Pieces**: The cases prepared by graduate students in APPE's seminar in research ethics were followed by commentaries by the authors and the ethicists who directed the seminar. They explore ethical issues in the context of the case's narrative in issues such as privacy, confidentiality, and informed consent. These ethical perspective pieces can be drawn out into a full blow analysis that follows a framework such as (1) problem specification, (2) solution generation, (3) solution testing, and (4) solution implementation.
- **Chronology**: A table outline in chronological order the key events of the case helps you and your reader stay on track.

Analyzing Your Case

1. **Do a Socio-Technical Analysis**: Use the examples found at m14025 to get you started. The STS will help you identify key problems.
2. **Specify Your Problem**: Look for conflicts between the values embedded in the STS. Look also for harmful consequences in the present, the short term future, and the long term future.
3. **Generate a Solution List. Refine that Solution List**: Work on changing and rebalancing elements in the STS to resolve the conflict or harmful consequences you scoped when specifying the problem.
4. **Test Your Solutions**: Use the Ethics Tests (reversibility, harms/benefits, and publicity) plus code and values tests to test your solution. Rank them.
5. **Implement Your Solution**: Using the feasibility test as a check list, identify possible resource, interest, and technical constraints that could impede the implementation of your solution.

Presentation on Problem Solving
https://cnx.org/content/m15991/

Clicking on this media file

will open a powerpoint presentation on problem solving in ethics. It outlines specifying the problem, generation solutions, testing solutions, and implementing solutions. This problem solving method is based on an analogy between ethics and design.

Advice for Preparing a Poster on Your Case

- **Your Objective**: Develop a Poster that captures the case's narratives and summarizes the different stages of a case analysis framework. In the figure below, we have appended an excellent poster presentation developed by Dr. Carlos Rios.
- **Dimensions**: Your poster should print out onto a piece of paper two feet by three feet. It should be available digitally in ppt format (either version 2003 or 2007).
- **Due Date: May 1 for presentation in class either May 1 or May 8.**
- **Content**: (1) summary of key ethically relevant facts; (2) highlight of the dominant elements of the case's socio-technical system; (3) an analysis of the case that includes problem definition, solutions generated, solution testing (in the form of a solution evaluation matrix), and a plan for implementing the solution over situational constraints; (4) Your names; (5) items that will help visually portray case elements such as flow charts and pictures.
- Make your case visually interesting and choose images that capture the essence of the concepts you are portraying. Be daring and exciting here.
- Practice presenting from your poster. And have fun!

Poster Presentation for GERESE NSF Project

https://cnx.org/content/m15991/

Clicking on this figure will
give you the poster
presentation prepared by
Dr. Carlos Rios for
GERESE, an NSF project
in research ethics for
graduate students.

Poster Presentation: Poehlman Case
https://cnx.org/content/m15991/

Clicking on this figure will
open a poster presentation
reporting on a case of
scientific misconduct.

The Poehlman Case analysis/poster is about half way completed. It has been included to give you an idea of how the case development process looks (and feels) at its mid point. The STS table included provides a sense of the gaps that need to be filled with further investigation and analysis. For example, more information could be collected on hormonal treatment therapy. The dialogue box quoting from one of the witnesses could be expanded into conversations between Poelman and the witness or between the witness and officials at the University of Vermont. The point is to identify gaps in the case development that can be filled with moral imagination and further research.

Content	Style
Information gaps such as details on hormone replacement therapy	Change "background" of poster; interferes with the title
Provide more depth such as personalities of participants	Do not use the same "background" for the Ethical Problem section or eliminate this part to create more space for other parts
Case needs "thickness" or more concrete detail	Difficult to read different sections (Too crowded)
Describe motivations of main participants, especially Poehlman	Better arrangement of pictures on poster space needed
More information such as the amount of money awarded to Poehlman in his grants	Eliminate shadows throughout poster
More information needed on ORI investigative procedures	Poster should have "depth" in the form of embedded links that open up background information
References to Wikipedia, the ORI publicity release, and Pascal presentation need to be in larger font	Empty space in Poster could be better utilized

Style- and Content-Based Criticisms of Poehlman Poster

What did you learn?

After you finish your poster presentation, take some time to reflect on the reaction of your teacher and classmates. Was it what you expected? How could you change things to align better your expectations and goals with results? What did you learn from developing this case? What were the obstacles, frustrations, or negative experience you faced in this exercise? Assess this exercise, your case, the reaction, and your experience in general.

Appendix

Below are supporting materials to help with you as you work through this module. They include a presentation on writing and analyzing cases, a table of basic moral concepts, and a table of intermediate moral concepts.
Presentation on Writing Cases
https://cnx.org/content/m15991/

Clicking on this figure will allow you to open a PowerPoint presentation on writing and analyzing cases. It provides a case taxonomy, suggestions on how to choose a case, templates for "filling out" a case, and a framework for analyzing a case.

Presentation onCase Writing
https://cnx.org/content/m15991/ https://cnx.org/content/m15991/
Basic Moral Concepts
https://cnx.org/content/m15991/

To help you develop and analyze your case, this media file contains tables that summarize basic

moral concepts such as goods, rights, duties, and virtues.

Intermediate Moral Conceptse
https://cnx.org/content/m15991/

Clicking on this figure will open a table that summarizes intermediate moral concepts such as privacy, informed consent, and safety. These concepts will help you to choose, develop and analyze your case.

EAC ToolKit Project

This module is a WORK-IN-PROGRESS; the author(s) may update the content as needed. Others are welcome to use this module or create a new derived module. You can COLLABORATE to improve this module by providing suggestions and/or feedback on your experiences with this module.

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Destrezas de Información - Parte I
Este módulo ayudará a desarrollar destrezas para identificar, localizar y evaluar críticamente las fuentes de información y su contenido. El estudiante podrá realizar búsquedas efectivas a través de bases de datos adecuadas que ofrecen información relevante para complementar el contenido del curso o para completar la preparación de asignaciones y proyectos académicos.

Unidad: Propuesta CIVIS (Centro de Recursos para la Educación General/Center for Resources in General Education) U.S. Department of Education grant 84.031S, 2009-2012

Módulo: Destrezas de información

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Nivel y enfoque: Estudiantes subgraduados en áreas de ingeniería, ciencias y matemáticas

Duración: 3 horas

Resumen: Este módulo tiene como propósito desarrollar algunas de las destrezas básicas de información en estudiantes a nivel subgraduado, en particular estudiantes de ciencias, matemáticas e ingeniería. Está separado en tres partes para facilitar la enseñanza del mismo: 1) Identificación y clasificación de la literatura, 2) Estrategias de búsqueda aplicadas a las bases de datos para buscar información primaria y 3) Evaluación de información en la Web. El módulo es flexible, sus partes pueden ofrecerse por separado, en periodos de 50 minutos aproximadamente u ofrecerse como una clase de 3 horas.

En la parte 1, se describen las características particulares de cada clasificación para poder identificar y diferenciar entre una y otra. La parte 2 describe y explica los pasos del procesos de investigación y la aplicación de operadores booleanos en bases de datos académicas para buscar artículos de información primaria. En la parte 3, se ofrecen algunas ideas prácticas para realizar búsquedas eficientes en Internet y se discuten los criterios básicos

para evaluar la información encontrada. Esta parte del modulo bien puede ofrecerse en conjunto con la parte 2 u omitirse del todo para una redistribución del tiempo. Cada parte del módulo contiene un ejercicio de práctica para aplicar el conocimiento adquirido y avaluar el módulo mismo.

Ambiente: El módulo fue diseñado para ofrecerse como taller, en colaboración (team-teaching) entre el profesor del curso donde será integrado el módulo y los diseñadores del mismo. La primera vez que se ofrezca el módulo, el diseñador dirigirá el taller. El profesor observará y tomará nota para mejorarlo. Las partes se reunirán para intercambiar impresiones y editar el módulo según lo consideren necesario. Este se implementará en una segunda ocasión (en un grupo similar al anterior), pero los roles entre diseñador y profesor se cambiarán. Habiendo evaluado los resultados de los primeros cambios al módulo, se decidirá la versión final del mismo para su posterior integración por el profesor como parte regular de su curso en todas sus secciones.

El taller debe ofrecerse en un salón o centro de cómputos donde haya contacto visual entre los participantes y quien ofrece el módulo. Cada estudiante debe tener una computadora disponible con acceso a Internet y a las bases de datos durante todo el taller.

Objetivos instruccionales: Al finalizar el módulo los estudiantes podrán:

- Distinguir entre literatura popular y científica
- Diferenciar entre literatura primaria y secundaria
- Aplicar estrategias efectivas de búsqueda en las bases de datos para hallar información primaria
- Evaluar páginas e información de Internet usando criterios específicos

Materiales, equipo y tecnología:

- [Presentaciones en Power Point](#)
- Conexión a Internet
- Varias revistas de la disciplina
- Acceso a bases de datos académicas
- Proyector
- Pizarra y marcadores

Estrategias de enseñanza: El módulo fue diseñado para ofrecerse como taller, con la ayuda visual de una presentación. Se efectuarán ejercicios de práctica durante el mismo y se asignarán tareas para después. El módulo puede complementarse con información sobre el plagio y la construcción de referencias bibliográficas.

Destrezas o requisitos: Para completar el módulo con éxito es necesario que los participantes del mismo puedan hacer prácticas significativas para ellos, por lo que se sugiere que cada uno tenga un tema asignado o seleccionado del que tenga que buscar información específica. Los participantes deben tener destrezas básicas en el uso de la computadora y de Internet: prender y apagar el equipo, abrir y cerrar ventanas de Internet, entre otras.

Actividades (contenido):

Parte I – Información primaria vs secundaria y Fuentes científicas vs populares

Definiciones

- **Clasificación de la información** – La información se clasifica dependiendo del propósito y la audiencia a la que se dirige. Generalmente, en las ciencias la información se clasifica en dos maneras: primaria o secundaria y de acuerdo a su audiencia científica o popular
- **Literatura primaria** – Fuentes de información que provienen del propio autor, de primera mano o fuente principal. Esta literatura informa resultados de experimentos, observaciones e investigaciones científicas. Está escrita por el científico o investigador mismo. Se publica en revistas académicas, conferencias, informes de gobierno y patentes.
- **Literatura secundaria** – Fuentes de información que reseñan, resumen o interpretan información de fuentes primarias. Provee información general o de referencia. Los autores generalmente son personas sin relación directa con la investigación. Se publica en

revistas generales, multidisciplinarias, periódicos, blogs, páginas de Internet, libros de texto, enciclopedias, entre otros.

- **Fuentes de información** – Recursos impresos o electrónicos que contienen información sobre algún asunto

  - **Publicaciones personales** – Blogs, páginas de Internet, etc. Según el autor y el contenido pueden ser información primaria o secundaria.
  - **Revista científica** – Es literatura primaria. También conocida como revista revisada por pares, revista arbitrada o revista académica. Está escrita por expertos o especialistas en el tema y es revisada y aprobada para su publicación por otros expertos en el mismo tema. Su contenido se caracteriza por analizar profundamente los asuntos, por lo que los artículos son extensos y su lenguaje técnico.
  - **Revista científica multidisciplinaria** – Está escrita por expertos, pero su propósito principal es difundir el conocimiento entre los especialistas de la disciplina. Puede contener literatura primaria como secundaria.
  - **Revista popular y periódico** – Es literatura secundaria. Está escrita por periodistas o aficionados al tema en lenguaje común y sencillo. Su contenido puede ser bien variado.

Cómo identificar y clasificar la literatura según su audiencia y contenido: Listas de Cotejo

Literatura primaria	Literatura secundaria
Información de primera mano	Resumen, interpretación o análisis de la información original
Escrita por el investigador	Escrita por una segunda persona

mismo	
Informa sobre observaciones, resultados o experimentos	Ofrece información de contexto
Publicada mayormente en forma de artículos de revistas especializadas, tesis, conferencias profesionales o patentes	Publicada en revistas populares, periódicos, libros de texto, enciclopedias, páginas de Internet y otras fuentes secundarias

Lista de cotejo 1

Revista científica	Revista popular	Revista multidisciplinaria
Literatura primaria	Literatura secundaria	Literatura primaria y secundaria
Artículos extensos	Artículos cortos	Artículos cortos y largos
Lenguaje técnico	Lenguaje popular y sencillo	Lenguaje semi-sencillo
Poco color o ninguno	Mucho color e ilustraciones	Algún color e ilustraciones
Graficas de data en blanco y negro	Fotos e imágenes llamativas y vistosas, con brillo	Puede contener imágenes con brillo

No contiene anuncios comerciales	Tiene muchos anuncios comerciales variados, no relacionados entre sí	Comerciales o anuncios directamente relacionados con el tema de la publicación
Costosa	Económica	Pueden ser costosa o económica
Compra por subscripción	Compra directa en puestos, tiendas y librerías	Por subscripción o compra directa
Escrita por expertos	Escrita por aficionados	Escrita por especialistas
Dirigida a expertos	Dirigida al público general	Personas de la disciplina
Temas especializados	Temas de interés general	Temas de interés para especialistas
Contiene referencias y bibliografía	No contiene referencias ni bibbliografía	A veces contiene referencias
Ejemplos: Journal of Civil Engineering, Plant Biology	Ejemplos: Popular Mechanics, Sport Illustrated	Ejemplos: Nature, Science

Lista de cotejo 2

Avalúo:

Avalúo formal – Como prueba corta o tarea, asigne al estudiante el siguiente ejercicio.

- Identifica varias revistas en tu disciplina y clasifícalas en revistas populares, científicas o multidisciplinarias.
- Selecciona un artículo que puedas usar para desarrollar tu tema o proyecto de clase y determina si el mismo es literatura primaria o secundaria. ¿Por qué lo clasificaste de esa manera?

Avalúo informal – Durante la presentación misma, utilice los clickers o la técnica de mano[footnote] en el pecho para que los estudiantes contesten el siguiente ejercicio.
Técnica de avalúo en el salón de clases. Asigne un número a cada alternativa y pida a los estudiantes que muestren la respuesta colocando en el pecho la cantidad de dedos que corresponde al número de la respuesta.

Muestre o describa las siguientes fuentes de información (seleccione las fuentes según el tema del curso) y en para cada fuente haga la misma pregunta: Clasifique la fuente en primaria o secundaria. Los estudiantes tendrán 30 segundos para contestar.

1. Libreta de laboratorio con notas y observaciones
2. Patente
3. Hoja de datos (Datasheet, ej. http://www.intel.com/support/processors/pentiumiii/sb/cs-023730.htm)

Repita el ejercicio, preguntando si la fuente es académica o popular

1. Video de YouTube: http://video.google.com/videoplay?docid=4291223655367640053#
2. Artículo de página de Internet
3. Artículo de base de datos

Ayuda disponible

- Por email – virtualref@uprm.edu
- Por chat – www.uprm.edu/library

- Por teléfono – ext. 2023 (Col. Referencia), ext. 2026 (CRRE), ext. 3584 (Circulación)

Anejos y documentos de apoyo

Insert paragraph text here.

- Hoja de Trabajo 1: https://cnx.org/content/m45129/
- Asignación 1: https://cnx.org/content/m45129/
- Presentación 1: http://uprm.edu/library/docs/tutorias/EvaluacionCriticaFuentesInformacion.ppt
- Hoja de Trabajo 2: Lista de cotejo: Información primaria vs secundaria y Fuentes académicas vs populares (para clasificación de fuentes) http://uprm.edu/library/docs/tutorias/ListaCotejoFuentes2012.pdf
- Rúbrica 1: Rúbrica para avaluar referencias http://uprm.edu/library/docs/tutorias/RubricaAvaluarReferencias2012.pdf
- Presentación 2: https://cnx.org/content/m45129/

Destrezas de Información - Parte II
Este módulo ayudará a desarrollar destrezas para identificar, localizar y evaluar críticamente las fuentes de información y su contenido. El estudiante podrá realizar búsquedas efectivas a través de bases de datos adecuadas que ofrecen información relevante para complementar el contenido del curso o para completar la preparación de asignaciones y proyectos académicos.

Unidad: Propuesta CIVIS (Centro de Recursos para la Educación General/Center for Resources in General Education) U.S. Department of Education grant 84.031S, 2009-2012

Módulo: Destrezas de información

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Nivel y enfoque: Estudiantes subgraduados en áreas de ingeniería, ciencias y matemáticas

Duración: 3 horas

Resumen: Este módulo tiene como propósito desarrollar algunas de las destrezas básicas de información en estudiantes a nivel subgraduado, en particular estudiantes de ciencias, matemáticas e ingeniería. Está separado en tres partes para facilitar la enseñanza del mismo: 1) Identificación y clasificación de la literatura, 2) Estrategias de búsqueda aplicadas a las bases de datos para buscar información primaria y 3) Evaluación de información en la Web. El módulo es flexible, sus partes pueden ofrecerse por separado, en periodos de 50 minutos aproximadamente u ofrecerse como una clase de 3 horas.

En la parte 1, se describen las características particulares de cada clasificación para poder identificar y diferenciar entre una y otra. La parte 2 describe y explica los pasos del procesos de investigación y la aplicación de operadores booleanos en bases de datos académicas para buscar artículos de información primaria. En la parte 3, se ofrecen algunas ideas prácticas para realizar búsquedas eficientes en Internet y se discuten los criterios básicos

para evaluar la información encontrada. Esta parte del modulo bien puede ofrecerse en conjunto con la parte 2 u omitirse del todo para una redistribución del tiempo. Cada parte del módulo contiene un ejercicio de práctica para aplicar el conocimiento adquirido y avaluar el módulo mismo.

Ambiente: El módulo fue diseñado para ofrecerse como taller, en colaboración (team-teaching) entre el profesor del curso donde será integrado el módulo y los diseñadores del mismo. La primera vez que se ofrezca el módulo, el diseñador dirigirá el taller. El profesor observará y tomará nota para mejorarlo. Las partes se reunirán para intercambiar impresiones y editar el módulo según lo consideren necesario. Este se implementará en una segunda ocasión (en un grupo similar al anterior), pero los roles entre diseñador y profesor se cambiarán. Habiendo evaluado los resultados de los primeros cambios al módulo, se decidirá la versión final del mismo para su posterior integración por el profesor como parte regular de su curso en todas sus secciones.

El taller debe ofrecerse en un salón o centro de cómputos donde haya contacto visual entre los participantes y quien ofrece el módulo. Cada estudiante debe tener una computadora disponible con acceso a Internet y a las bases de datos durante todo el taller.

Objetivos instruccionales: Al finalizar el módulo los estudiantes podrán:

- Distinguir entre literatura popular y científica
- Diferenciar entre literatura primaria y secundaria
- Aplicar estrategias efectivas de búsqueda en las bases de datos para hallar información primaria
- Evaluar páginas e información de Internet usando criterios específicos

Materiales, equipo y tecnología:

- [Presentaciones en Power Point](#)
- Conexión a Internet
- Varias revistas de la disciplina
- Acceso a bases de datos académicas
- Proyector
- Pizarra y marcadores

Estrategias de enseñanza: El módulo fue diseñado para ofrecerse como taller, con la ayuda visual de una presentación. Se efectuarán ejercicios de práctica durante el mismo y se asignarán tareas para después. El módulo puede complementarse con información sobre el plagio y la construcción de referencias bibliográficas.

Destrezas o requisitos: Para completar el módulo con éxito es necesario que los participantes del mismo puedan hacer prácticas significativas para ellos, por lo que se sugiere que cada uno tenga un tema asignado o seleccionado del que tenga que buscar información específica. Los participantes deben tener destrezas básicas en el uso de la computadora y de Internet: prender y apagar el equipo, abrir y cerrar ventanas de Internet, entre otras.

Actividades (contenido):

Parte II – Estrategias de búsqueda de información

- **A. Proceso de investigación** – Estos son los pasos mínimos que deben seguirse al momento de iniciar una investigación bibliográfica. Cada paso tiene sus propias características.

1. Definir el tema

    a. Asegúrese de comprender su tema – Debe poder explicarlo en sus propias palabras a una segunda persona

        i. Defina y aclare términos o conceptos que no comprende
        ii. Determine la cobertura, nivel, profundidad, en fin, delimite su tema

    b. Haga un torbellino de ideas y conceptos
    c. Identifique las palabras o frases claves

2. Desarrollar la estrategia de búsqueda (más detalles adelante) – La estrategia de búsqueda es el plan de acción para hacer búsquedas efectivas. Deberá utilizar el idioma inglés para poner en acción su estrategia, pues obtendrá mejores resultados.

a. Seleccione los términos de búsqueda
b. Identifique sinónimos de dichos términos
c. Identifique sus modificadores – periodo de tiempo, idioma, etc.
d. Seleccione la base de datos o catálogo a usar[footnote]
   Catálogo de la Biblioteca: http://unilib.uprm.edu, Bases de datos: http://www.uprm.edu/library/cre/listdbsp.php.
e. Construya sus parámetros de búsquedas *(Véase: Construyendo parámetros de búsqueda)*

3. Buscar la información

a. Comience su búsqueda usando las palabras claves o parámetros de búsqueda previamente seleccionados
b. Verifique los resultados
c. Determine si tiene acceso directo al texto completo, sea en formato impreso o electrónico
d. Localice el artículo o el recurso *(Véase: Localizando los recursos de información)*
e. Evalúe la información *(Véase: Parte III)*

4. Redacte el ensayo, artículo, poster, informe, etc.
5. Cree y organice la bibliografía *(Véase: Creando la bibliografía o lista de referencias)*– Tiene varias alternativas, ya sea que selecciones usar un Gestor de Referencias Bibliográficas (RMS – Reference Management System, Ej. Zotero, EndNote) o que decida crearlas manualmente según el manual de estilo que le sea solicitado.

- **B. Construyendo parámetros de búsqueda (search query)**

Se utilizan los operadores Boléanos (AND y OR) para elaborar los parámetros para búsqueda efectivas.

- Los conceptos o términos claves se conectan con el operador **AND**.

AND permite reducir los resultados de búsqueda acercando los mismos al enfoque que realmente usted interesa del tema. Este operador limita los resultados a aquellos que tengan presente todos los términos conectados, en

otras palabras, extraerá de la lista de resultados aquellos que tengan solo uno de los términos.

Ejemplo: Para buscar información sobre la historia de las computaras mis palabras claves serían *computers* y *history.* Si los conecto, obtengo: **computers AND history.**

Este parámetro de búsqueda le dará como resultados artículos que solo contengan los términos *computers* y *history*. Si faltara uno de éstos, el operador sacará el artículo de su lista de resultados.

Gráficamente usted tendría lo siguiente:
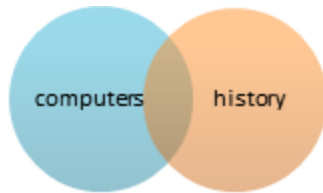
Sus resultados son representados por la intercesión de los círculos (sección ovalada en el centro), que es significativamente menor que los resultados que obtendría con una búsqueda sencilla de ambos términos, representada por ambos círculos a la vez.

Para hacer más <u>específica</u> la búsqueda o limitarla más puede añadirse otro término clave o usar uno de los modificadores como palabra clave.

Ejemplo: Si el tema fuese: La historia de las computadoras, pero desea delimitar el tema en Europa, podría añadirse como palabra clave. Los resultados serían, no solo la intersección de los círculos correspondientes a *computers* y *history*, sino la intersección de estos dos con el tercer círculo, *Europe*. Parámetro: *computers* **AND** *history* **AND** *Europe,* representado por el triángulo del centro.

- Los sinónimos de los conceptos o términos claves se conectan con el operador **OR**.

OR permite <u>ampliar</u> los resultados de búsqueda aumentando las posibilidades de recuperar artículos que usen un término de una manera y no de otra. Esto es particularmente importante considerando que no en todos los países se le llama a los objetos de la misma manera o hay más de una forma de escribir el mismo término. Este operador expande los resultados mostrando los artículos que contengan uno u otro de los términos conectados, en otras palabras, añadirá a la lista de resultados aquellos que contengan al menos uno de los términos.

Ejemplo: Para buscar información sobre la historia de las computaras las palabras claves serían *computers* y *history*. Si desea incluir en la búsqueda información sobre las laptops, podría conectar los términos así: **(***computers* **OR** *laptops***) AND** *history*. Cuando hay más de dos términos en nuestros parámetros de búsqueda es importante agrupar los mismos usando paréntesis.

Este parámetro de búsqueda le dará como resultados artículos que contengan *computer* y también *history* pero también les recuperará los que contengan laptops y *history*. Otra manera de verlo es que recuperará todo lo que contenga una de estas *computers o laptops* pero que estén acompañadas de *history*. Si faltara uno de éstos, el operador sacará el artículo de su lista de resultados.

Gráficamente usted tendría lo siguiente:

Sus resultados son representados por la forma marcada en negro, al centro de la figura. Note que aunque la gráfica es básicamente igual a la anterior, los resultados en cada caso son distintos, siendo más amplios los del parámetro OR.

- Otro parámetro de búsqueda es el corte por la raíz (truncation) representado con un asterisco (*) o un símbolo de interrogación (?). Se usa el corte por la raíz cuando en los términos clave tenemos palabras con una misma raíz. Este parámetro permite ampliar los resultados de búsqueda integrando las variaciones de un mismo término en dichos resultados. Además, permite que los resultados sean más completos, pues no necesariamente los términos aparecerán en los artículos de la forma exacta en que se escriben en los parámetros originales.

Ejemplo: Si uno de nuestros términos clave fuera economicspero también están las variables economy, economically, economic, etc. La raíz de los términos es econom, por lo que **econom*** sería el parámetro de búsqueda. Este parámetro puede utilizarse en combinación con AND y OR.

- Aunque no es muy utilizado en las bases de datos, en Internet hay un parámetro de búsqueda adicional que podemos aplicar. Se usan comillas (" ") para buscar **frases exactas**. Este parámetro limita los resultados a aquellos donde aparece la frase exacta entre las comillas, sin considerar ningún otro criterio. Por la gran cantidad de resultados que suelen obtenerse en una búsqueda tradicional en Internet, es recomendable identificar alguna frase clave y usarla entre comillas para limitar los resultados.

Ejemplo: Utilizando el mismo ejemplo, sobre la historia de las computadoras, al buscar en Internet será conveniente usar una frase como

"computers history", o tal vez "history of computers" para reducir los resultados.

En la siguiente tabla se presenta un resumen de los parámetros de búsqueda discutidos y en qué fuente es más recomendable usar cada uno de ellos. La tabla no representa una norma establecida, pero ciertamente no todos los parámetros de búsqueda funcionan con la misma efectividad en las bases de datos y en Internet

	AND	OR	Corte de raíz	Comillas
Bases de datos	X	X	X	
Internet	X			X

- **C. Localizando los recursos de información** (taller interactivo)

Libros – Pueden ser localizados usando el Catálogo de la Biblioteca o algunas bases de datos específicas. CRCNet Base y Gale Virtual Reference Library son algunas de las bases de datos que permiten localizar libros.

- A diferencia del Catálogo, las bases de datos proveen texto completo de la mayoría del contenido.
- En la Biblioteca los libros están distribuidos por colecciones, de la siguiente manera:

    - Circulación – 3er y 4to piso
    - Colección Puertorriqueña – 3er piso
    - Referencia – 1er piso

Resumen de los pasos:

1. http://www.uprm.edu

2. Seleccionar enlace Catálogo
3. Hacer la búsqueda usando las palabras claves y los parámetros construidos con ellas
4. Verificar los resultados – limítelos o auméntelos según lo considere necesario usando los parámetros de búsqueda y operadores (AND, OR…)
5. Seleccionar los recursos de interés
6. Anotar la clasificación y la ubicación del recurso
7. Localizar el recurso

- **Artículos** – Las bases de datos de la Biblioteca General proveen acceso rápido y organizado a artículos publicados en distintas revistas académicas y populares. La Biblioteca se subscribe a las mismas anualmente para que toda la comunidad académica pueda acceder a su contenido y efectuar sus búsquedas e investigaciones desde cualquier computadora con acceso a Internet. Mientras la búsqueda se efectúe desde el Recinto, el acceso será directo. Por otro lado, si intenta acceder remotamente, necesitará autenticarse. Debe usar el mismo nombre de usuario y clave de acceso que usa para acceder a su cuenta o correo institucional (upr.edu).

La información encontrada mediante las bases de datos es más confiable que la de otras fuentes no académicas. Se provee acceso a bases de datos generales y especializadas.

Ejemplo: Generales

• Academic Search Premier

• Central

• Academic Research Library

• Otras

Especializadas

• Engineering Village

• IEEE

• MathScinet

• American Chemical Society

• Otras

Resumen de pasos:

1. http://www.uprm.edu/library
2. Seleccionar Bases de datos
3. Seleccionar la base de datos específica que interesa usar (sea general o especializada)
4. Hacer la búsqueda usando las palabras claves y los parámetros construidos con ellas
5. Verificar los resultados – limítelos o auméntelos según lo considere necesario usando los parámetros de búsqueda y operadores (AND, OR…)
6. Seleccionar el artículo o artículos de interés
7. Determinar si el mismo está accesible en texto completo mediante enlace directo al PDF o HTML
8. Localizar el recurso

Localizar artículos que no se encuentran en texto completo

- Revistas electrónicas

  ○ A través de la base de datos A-to-Z – Efectúa búsqueda simultánea en todas las revistas de texto completo para localizar el artículo de interés (independientemente de en qué base de datos se encuentre).
  ○ Otra alternativa es usar Google Académico (http://scholar.google.com) o Scirus (http://www.scirus.com) – hacen lo mismo que A-to-Z, con la diferencia que si está accediendo fuera del Recinto, probablemente no le darán acceso gratuito al texto completo.

- Préstamo Interbibliotecario – Servicio bibliotecario que localiza el artículo o recurso que usted necesita (y que la Biblioteca General no posee) y lo hace disponible para usted.

- Revistas impresas – Pueden ser localizadas a través del Catálogo. Están organizadas en orden de clasificación.

  - Colección de Revistas y Recursos Electrónicos (CRRE) – 1er y 2do piso
  - Colección Puertorriqueña – 3er piso

Avalúo:

Avalúo formal – Como prueba corta o tarea, asigne al estudiante el siguiente ejercicio.

- Localice tres recursos de información confiables y significativos para su tema de investigación. Debe incluir dos artículos académicos de una de las bases de datos de la Biblioteca y un libro impreso disponible en la misma.
- Describa brevemente cómo el taller le ayudó a localizar las referencias solicitadas.

Avalúo informal – Durante el taller, los estudiantes completarán la hoja de práctica y el ejercicio de búsqueda (Anejo) aplicando el contenido del taller a su tema. El ejercicio bien podría usarse como avaló formal.

Ayuda disponible

- Por email – virtualref@uprm.edu
- Por chat – www.uprm.edu/library
- Por teléfono – ext. 2023 (Col. Referencia), ext. 2026 (CRRE), ext. 3584 (Circulación)

Anejos y documentos de apoyo

- Hoja de Trabajo 1: https://cnx.org/content/m45125/
- Asignación 1: https://cnx.org/content/m45125/

- Presentación 1:
  http://uprm.edu/library/docs/tutorias/EvaluacionCriticaFuentesInformacion.ppt
- Hoja de Trabajo 2: Lista de cotejo: Información primaria vs secundaria y Fuentes académicas vs populares (para clasificación de fuentes) http://uprm.edu/library/docs/tutorias/ListaCotejoFuentes2012.pdf
- Rúbrica 1: Rúbrica para avaluar referencias http://uprm.edu/library/docs/tutorias/RubricaAvaluarReferencias2012.pdf
- Presentación 2: https://cnx.org/content/m45125/

Destrezas de Información - Parte III
Este módulo ayudará a desarrollar destrezas para identificar, localizar y evaluar críticamente las fuentes de información y su contenido. El estudiante podrá realizar búsquedas efectivas a través de bases de datos adecuadas que ofrecen información relevante para complementar el contenido del curso o para completar la preparación de asignaciones y proyectos académicos.

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para evaluar la información encontrada. Esta parte del modulo bien puede ofrecerse en conjunto con la parte 2 u omitirse del todo para una redistribución del tiempo. Cada parte del módulo contiene un ejercicio de práctica para aplicar el conocimiento adquirido y avaluar el módulo mismo.

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- Diferenciar entre literatura primaria y secundaria
- Aplicar estrategias efectivas de búsqueda en las bases de datos para hallar información primaria
- Evaluar páginas e información de Internet usando criterios específicos

Materiales, equipo y tecnología:

- Presentaciones en Power Point
- Conexión a Internet
- Varias revistas de la disciplina
- Acceso a bases de datos académicas
- Proyector
- Pizarra y marcadores

Estrategias de enseñanza: El módulo fue diseñado para ofrecerse como taller, con la ayuda visual de una presentación. Se efectuarán ejercicios de práctica durante el mismo y se asignarán tareas para después. El módulo puede complementarse con información sobre el plagio y la construcción de referencias bibliográficas.

Destrezas o requisitos: Para completar el módulo con éxito es necesario que los participantes del mismo puedan hacer prácticas significativas para ellos, por lo que se sugiere que cada uno tenga un tema asignado o seleccionado del que tenga que buscar información específica. Los participantes deben tener destrezas básicas en el uso de la computadora y de Internet: prender y apagar el equipo, abrir y cerrar ventanas de Internet, entre otras.

Actividades (contenido):

Parte III – Evaluación de la información

Es importante evaluar la información que usamos en investigaciones ya que de lo contrario la misma se afectará negativamente. Las bases de datos de la Biblioteca proveen una alternativa adicional a las diferentes fuentes de búsqueda, limitar los resultados por tipo de recurso incluyendo aquellos que han sido previamente evaluados por expertos en la materia. Incluso los dividen en populares y académicos, facilitando el proceso de selección. Por otro lado, los recursos encontrados o accedidos a través de un buscador de Internet (search engine) no tienen estas alternativas. Toda la información encontrada en ellos debe ser evaluada cuidadosamente antes de usarla.

Guía para evaluar información y páginas de Internet

¿Qué?	¿Sobre QUÉ trata la página de internet? ¿Tiene la clase de información que necesitas? ¿La página es

	académica o popular? ¿Incluye literatura primaria?
¿Quién?	¿QUIÉN creó la página de internet? ¿Están disponibles las credenciales del autor, ya sea un individuo o una organización?
¿Dónde?	¿De DÓNDE procede la información?e.g., .edu=educativa, .com=comercial, .org=organización, .gov=gobierno
¿Por qué?	¿POR QUÉ la página está en el Internet y cómo eso afecta la información? ¿Están claramente expuestos los objetivos del autor
¿Cuándo?	¿CUÁNDO se actualizó la información o la página? ¿Es importante la fecha para la relevancia del contenido
¿Cuán?	CUÁN confiable o precisa es esta página? ¿Informa sobre hallazgos primarios? ¿Será una buena fuente de información para un trabajo investigativo

Avalúo:

Avalúo formal – Como prueba corta o tarea, asigne al estudiante el siguiente ejercicio.

Localice al menos un artículo o página de Internet sobre su tema de investigación aplicando las estrategias y parámetros discutidos en el taller. Luego de evaluar la referencia, conteste las siguientes preguntas:

- ¿Cuán confiable resultó ser las referencias que seleccionaste?
- ¿Es clasificada como literatura primaria o secundaria?
- ¿Cuán apropiado es que la uses esta información en tu trabajo de investigación?

Avalúo informal – Luego de hacer el avalúo formal, puede aplicarse la técnica del diario reflexivo o la de *one minute paper* para que describan brevemente lo que piensan sobre el uso de Internet vs las bases de datos como alternativas de búsqueda para información confiable.

Creando la bibliografía o lista de referencias

Las referencias son una manera de evitar el plagio, delito que consiste en hacer pasar por propias las palabras, ideas o creación de otros. Usar referencias no es otra cosa que dar crédito al trabajo intelectual de otras personas, a la vez que facilita la verificación de la información y permite al lector dar continuidad a la investigación.

- Existen distintos manuales de estilo que se usan para crear y organizar las referencias. Cada disciplina usa uno en particular, por ejemplo, ingeniería usa IEEE Editorial Style Manual http://standards.ieee.org/guides/style/2009_Style_Manual.pdf
- Mendeley, Zotero, EndNote y otros programados facilitan la creación organización de las referencias. Estos RMS funcionan para varios manuales. Puede conseguir más información en www.zotero.org, http://www.mendeley.com/

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- Por chat – www.uprm.edu/library
- Por teléfono – ext. 2023 (Col. Referencia), ext. 2026 (CRRE), ext. 3584 (Circulación)

Anejos y documentos de apoyo

- Hoja de Trabajo 1: https://cnx.org/content/m45123/
- Asignación 1: https://cnx.org/content/m45123/
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- Presentación 2: https://cnx.org/content/m45123/

Moral Exemplars in Business and Professional Ethics
This module has been designed to build the foundation for a practical approach to virtue ethics. Student are provided with the names of several moral exemplars in business and professional ethics. They are then asked to identify the traits, attitudes, emotions, and skills that make these individuals moral exemplars. Textboxes acquaint students with moral exemplar studies that have been carried out. The links included in this module help students identify online and offline sources that describe moral exemplars and outline moral exemplar studies. This module is being developed as a part of an NSF-funded project, "Collaborative Development of Ethics Across the Curriculum Resources and Sharing of Best Practices," NSF SES 0551779.

Module Introduction

Through the activities of this module you will learn to balance cautionary tales in business and professional ethics with new stories about those who consistently act in a morally exemplary way. While cautionary tales teach us what to avoid, narratives from the lives of moral exemplars show us how to be good. A study of moral best practices in business and professional ethics shows that moral exemplars exhibit positive and learnable skills. This module, then, looks at moral exemplars in business and the professions, outlines their outstanding accomplishments, and helps you to unpack the strategies they use to overcome obstacles to doing good.

You will begin by identifying outstanding individuals in business and associated practices who have developed moral "best practices." Your task is look at these individuals, retell their stories, identify the skills that help them do good, and build a foundation for a more comprehensive study of virtue in occupational and professional ethics.

Moral Exemplar Terms

Moral Exemplar

- An individual who demonstrates outstanding moral conduct often in the face of difficult or demanding circumstances. (Beyond the "call of duty" Your first item here

- Often moral exemplars perform actions that go beyond what is minimal, required, ordinary, or even extra-ordinary.
- Moral exemplars perform actions that are "above and beyond the call of duty."
- Most important, they perform these actions repeatedly across a career or even a lifetime. In some way, their exemplary conduct has become "second nature."

Supererogatory

- **"A supererogatory act is an act that is beyond the call of duty. It is something that is morally good to do but not obligatory. Examples of supererogatory acts are donating blood, volunteering on a rape crisis hotline, babysitting (without accepting recompense) a friend's two-year old triplets for the afternoon, or throwing oneself on a live hand grenade in order to save one's buddies' lives."** (Baron, 1997: 614)
- Baron's definition (found in the Encyclopedia of Business Ethics) captures how the supererogatory occupies a moral space well above that of the minimally decent or even the ordinary.Your second item here. Supererogatory actions are outstanding, extra-ordinary, and exemplary in both moral and practical senses.
- Urmsom, a moral philosopher, remarks how the supererogatory has been neglected (up to the mid-twentieth century) by moral philosophy, dominated as it was in the previous century by the debate between Utilitarianism and Deontology.
- Two quotations from Urmson show this clearly: (1)**"But it does seem that these facts have been neglected in their general, systematic accounts of morality. It is indeed easy to see that on some of the best-known theories there is no room for such facts"** (Urmson, 1958, p. 206). (2)**"[s]imple utilitarianism, Kantianism, and intuitionism, then, have no obvious theoretical niche for the saint and the hero"** (Urmson, 1958: 207).
- Baron, M. (1997). "Supererogation", Blackwell Encyclopedic Dictionary of Business Ethics, Patricia H. Werhane and R. Edward Freeman, eds., New York: Blackwell: 614-7.

- Urmson, J.O. (1958). "Saints and Heroes." Essays in Moral Philosophy, A.I. Melden, ed., Seattle: University of Washington Press: 198-216.

Moral Minimum

- Compare and distinguish the idea of the supererogatory with that of the moral minimum.
- The difference is between that which is morally exemplary versus that which is just over the threshold of wrongdoing.
- **"I suggest that moral minimums are best understood as negative standards, universally agreed upon "bottom lines" beyond which it is morally questionable to act. For example, it is almost always wrong to deliberately harm or contribute to harming another person or persons; to deliberately violate their rights to freedom, life, or property; to treat individuals or classes of individuals with disrespect; to compete or cooperate unfairly; not to honor promises or contract; or to be dishonest or deceitful. Whereas these moral minimums do not define goodness, fairness, or benefit, or define the positive content of rights, they set minimum guidelines for behavior that most people everywhere might agree on…."** (Werhane, 1999: 122).
- Werhane, P. (1999). Moral Imagination and Management Decision-Making, Oxford, UK: Oxford University Press.

Moral Exemplar Criteria in Computing

1. Either a sustained commitment to moral ideals or ethical principles in computing that include a generalized respect for humanity or sustained evidence of moral virtue in the practice of computing.
2. A disposition to make computing decisions in accord with one's moral ideals or ethical principles, implying a consistency between one's actions and intentions and between the means and ends of one's actions
3. A willingness to risk one's self interest for the sake of one's moral values.
4. A tendency to be inspiring to other computer professional and thereby to move them to moral action

5. A sense of realistic humility about one's own importance relative to the world at large, implying a relative lack of concern for one's own ego.
6. Huff, C. and Barnard, L. (2009). "Good Computing: Moral Exemplars in the Computing Profession", IEEE Technology and Society Magazine: 47-54.

Responders and Idealists

- This quotation from Blum provides a nice characterization of "moral responders."
- "the 'responder' moral exemplar does not, prior to confronting situations in which she manifests moral excellence, possess a set of moral principles which she has worked out explicitly, committed herself to, and attempted to guide her life by."
- "the responder respnods to the situations she faces and to individuals in a 'morally excellent way.'".
- Blum, L. (1994). "Moral Exemplars: reflections on Schindler, the Trochmés, and others", Moral Perception and Particularity, Cambridge, Mass.: Cambridge University Press: 65-97.

Idealists

- According to Blum (and Hailie), Magda Trochme is a responder while her husband, Andre Trochme is an idealist. Both perform morally exemplary and supererogatory actions but out of different motivations.
- "To be an idealist [one] must see these ideals as more than merely personal goals or a personal conception of the good. They must be formulated as general values, and regarded by the agent as having some kind of intrinsic worth or general validity.
- Blum, L. (1994). "Moral Exemplars: reflections on Schindler, the Trochmés, and others", Moral Perception and Particularity, Cambridge, Mass.: Cambridge University Press: 65-97.

Moral Heroes and Moral Saints

- Moral heroes achieve their good and excellent goals only by making substantial sacrifices. The notion of self-sacrifice is the key

distinguishing characteristic of this kind of exemplar.
- What distinguishes moral saints from other kinds of moral exemplar is the criterion of moral faultlessness; these exemplars achieve their excellences by means of conduct that is free from any moral flaw.
- Moral saints are often used to argue for the unity of virtues thesis, namely, that the virtues work together forming a system where each is necessary and mutually supports the others.

	Moral Heroes	Moral Saints
Idealists	MLK and Andre Trochme	Thomas More
Responders	Magda Trochme and Oscar Schindler	Mother Teresa and Saint Francis

Table of Moral ExemplarsTable of Moral Exemplars

Exercise 1: Choose a moral exemplar

- Identify a moral exemplar and provide a narrative description of his or her life story.
- To get this process started, look at the list of moral exemplars provided in this module. The links in the upper left hand corner of this module will help you to explore their accomplishments in detail. Feel free to choose your own exemplar. Make sure you identify someone in the occupational and professional areas such as business and engineering. These areas have more than their share of exemplars, but they tend to escape publicity because their actions avoid publicity generating disasters rather than bring them about.

Moral Exemplars

- 1. William LeMesseur. LeMesseur designed the Citicorp Building in New York. When a student identified a critical design flaw in the building during a routine class exercise, LeMesseur responded, not by shooting the messenger, but by developing an intricate and effective plan for correcting the problem before it issued in drastic real world consequences. Check out LeMesseur's profile at onlineethics and see how he turned a potential disaster into a good deed.
- 2. Fred Cuny, starting in 1969 with Biafra, carried out a series of increasingly effective interventions in international disasters. He brought effective methods to disaster relief such as engineering know-how, political savvy, good business sense, and aggressive advocacy. His timely interventions saved thousands of Kurdish refugees in the aftermath of the Persian Gulf War in 1991. He also helped design and implement an innovative water filtration system in Sarajevo during the Bosnia-Serb conflict in 1993. For more details, consult the biographical sketch at onlineethics.
- 3. Roger Boisjoly worked on a team responsible for developing o-ring seals for fuel tanks used in the Challenger Shuttle. When his team noticed evidence of gas leaks he made an emergency presentation before officials of Morton Thiokol and NASA recommending postponing the launch scheduled for the next day. When decision makers refused to change the launch date, Boisjoly watched in horror the next day as the Challenger exploded seconds into its flight. Find out about the courageous stand Boisjoly took in the aftermath of the Challenger explosion by reading the biographical sketch at onlineethics.
- 4. Muhammad Yunus won the Nobel Prize for Peace in 2006. His effort in setting up "micro-businesses" funded through "micro-lending" has completely changed the paradigm on how to extend business practices to individuals at the bottom of the pyramid. Learn about his strategies for creating micro-businesses and how those strategies have been extended throughout the world, including Latin America, by listening to an interview with him broadcast by the Online News Hour. (See link included in this module.)

- 5. Bill Gates has often been portrayed as a villain, especially during the anti-trust suit against Mircosoft in the mid 1990's. Certainly his aggressive and often ruthless business practices need to be evaluated openly and critically. But recently Gates stopped participating in the day-to-day management of his company, Microsoft, and has set up a charitable foundation to oversee international good works projects. Click on the link included in this module to listen to and read an interview recently conducted with him and his wife, Melinda, on their charitable efforts.
- 6. Jeffrey Skilling, former CEO of Enron, can hardly be called a moral exemplar. Yet when Enron was at its peak, its CEO, Jeffrey Skilling, was considered among the most innovative, creative, and brilliant of contemporary corporate CEOs. View the documentary, The Smartest Guys in the Room, read the book of the same title, and learn about the configuration of character traits that led to Skilling's initial successes and ultimate failure. A link included in this module will lead you to an interview with Skilling conducted on March 28, 2001.
- Inez Austin worked to prevent contamination from nuclear wastes produced by a plutonium production facility. Visit Online Ethics by clicking on the link above to find out more about her heroic stand.
- Rachael Carson's book, The Silent Spring, was one of the key events inaugurating the environmental movement in the United States. For more on the content of her life and her own personal act of courage, visit the biographical profile at Online Ethics. You can click on the Supplimental Link provided above.

Exercise Two: Moral Exemplar Profiles

- What are the positive and negative influences you can identify for your moral exemplar?
- What good deeds did your exemplar carry out?
- What obstacles did your moral exemplar face and how did he or she overcome them?
- What skills, attitudes, beliefs, and emotions helped to orient and motivate your moral exemplar.?

Exercise Three

Prepare a short dramatization of a key moment in the life of your group's moral exemplar.

Textbox: Two different Types of Moral Exemplar

- Studies carried out by Chuck Huff into moral exemplars in computing suggest that moral exemplars can operate as craftspersons or reformers. (Sometimes they can combine both these modes.)
- Craftspersons (1) draw on pre-existing values in computing, (2) focus on users or customers who have needs, (3) take on the role of providers of a service/product, (4) view barriers as inert obstacles or puzzles to be solved, and (5) believe they are effective in their role.
- Reformers (1) attempt to change organizations and their values, (2) take on the role of moral crusaders, (3) view barriers as active opposition, and (4) believe in the necessity of systemic reform
- These descriptions of moral exemplars have been taken from a presentation by Huff at the STS colloquium at the University of Virginia on October 2006. Huff's presentation can be found at the link provided in the upper left hand corner of this module.

Elements of a Life Story Interview

- Major Influences
- Peak and Nadir Experiences
- Challenges and Opportunities.
- Goals, Values, and Objectives
- Commentary: The life story interview collects the subject's life in narrative form. Those conducting to the interview along with those studying it are skilled in identifying different patterns and structures in the interview. (Identifying and classifying the patterns is called "coding".)
- Huff, Rogerson, and Barnard interviewed moral exemplars in computing in Europe and coded for the following: "social support and antagonism, the use of technical or social expertise, the description of harm to victims or need for reform, actions taken toward reform,

designs undertaken for users or clients, effectiveness and ineffectiveness of action, and negative and positive emotion" (Huff and Barnard, 2009: 50).
- They identified two kinds of moral exemplars in computing: helpers (or craftspersons) and reformers.

Helpers and Reformers

- **Craftspersons** work to preserve existing values, see themselves as providers of a service, frame problems as overcoming barriers, and seek ethical ends (Huff and Barnard, 2009: 50).
- **Reformers** focus on social systems, see themselves as moral crusaders, work to change values, view individuals as victims of injustice, and take system reform as their goal (Huff and Barnard, 2009: 50).

What Makes a Moral Exemplar? PRIMES Explained

General Comments on Exemplars

- Moral exemplars have succeeded in integrating moral and professional attitudes and beliefs into their core identity. Going against these considerations for moral exemplars is tantamount to acting against self. Acting in accordance with them becomes second nature.
- Moral exemplars often achieve their aims with the support of "support groups." In fact, moral exemplars are often particularly adept at drawing support from surrounding individuals, groups and communities. This goes against the notion that exemplars are isolated individuals who push against the current. (Not all exemplars need fit as heroes into Ayn Rand novels.)
- Moral exemplars often do not go through periods of intensive and prolonged deliberation in order to hit upon the correct action. If we want a literary example, we need to replace the tortured deliberations of a Hamlet with the quick and intuitive insight of an Esther Summerson. (Summerson is a character in Charles Dickens' novel, Bleak House. See both William Shakespeare and Charles Dickens for more examples of villains and exemplars.) Some have situated moral

exemplars within virtue ethics. They have cultivated moral habits that allow them to do good as second nature. They have also found ways to integrate moral reasoning with emotion (as motive), perception (which helps them zero in on moral relevance), and skill (which helps implement moral value). In this sense, moral expertise functions much as athletic or technical expertise; all are difficult to acquire but once acquired lead to highly skilled actions performed almost effortlessly.

PRIMES

Primes stands for Personality, Integrating value into self-system, Moral Ecology, and Moral Skills Sets. These are the elements composing moral expertise that have been identified by Huff and Rogerson based on interviews they conducted with exemplars in the areas of computing.

Personality

- Moral exemplars exhibit different configurations of personality traits based on the big five. Locate the moral exemplar you have chosen in terms of the following five continuums (or continua):
- Neuroticism to Lack of Neuroticism (Stability?)
- Agreeableness to Disagreeableness
- Extraversion to Introversion
- Openness to Closedness
- Conscientiousness to Lack of Conscientiousness
- Examine your exemplar on each of these scales. In and of themselves, these qualities are neither good nor bad. They can be integrated to form bad characters or good characters. In many cases, moral exemplars stand out through how they have put their personality characteristics to "good use." (They have used them as vehicles or channels to excellence.)

Integrating Moral Value into Self-System

- As said above, moral exemplars stand out by the way in which (and the extent to which) they have integrated moral value into their self-system. Because of this, they are strongly motivated to do good and avoid doing bad. Both (doing good and refraining from doing bad) express who they are. If they slip into bad deeds, this motivational system pushes them to improve to avoid repeating bad deeds.

- One way of integrating moral value into self-system is by looking at stories and narratives of those who have displayed moral excellence. Many of the individuals portrayed above (Carson, Boisjoly, LeMesseur, Cuny, Austin, and Yunus) provide concrete models of outstanding moral careers.
- Literature also provides its models of moral exemplars. Charles Dickens paints especially powerful portraits of both moral heroes (Esther Summerson and "Little Dorritt") and villains (Heep and Skimpole).
- Other vehicles for integrating moral value centrally into the self-system lie in affiliations, relationships, and friendships. Aristotle shows the importance of good friendships in developing virtues. Moral exemplars most often can point to others who have served as mentors or strong positive influences. For example, Roger Boisjoly tells of how he once went to a senior colleague for advice on whether to sign off on a design that was less than optimal. His colleague's advice: would you be comfortable with your wife or child using a product based on this design?
- The ethicist, Bernard Williams, has argued forcefully for the importance of personal projects in establishing and maintaining integrity. Personal projects, roles, and life tasks all convey value; when these hold positive moral value and become central unifying factors in one's character, then they also serve to integrate moral value into the self system.
- Augusto Blasi, a well known moral psychologist, gives a particularly powerful account (backed by research) of the integration of moral value into self-system and its motivational effect.

Moral Ecology

- Moral Ecologies: "The term moral ecology encourages us to consider the complex web of relationships and influences, the long persistence of some factors and the rapid evolution of others, the variations in strength and composition over time, the micro-ecologies that can exist within larger ones, and the multidirectional nature of causality in an ecology." From Huff et. al.

- Moral ecologies refer to social surrounds, that is, the different groups, organizations, and societies that surround us and to which we are continually responding.
- We interact with these social surrounds as organisms interact with their surrounding ecosystems. In fact, moral ecologies offer us roles (like ecological niches) and envelop us in complex organizational systems (the way ecosystems are composed of interacting and interrelated parts). We inhabit and act within several moral ecologies; these moral ecologies, themselves, interact. Finally, moral ecologies, like natural ecosystems, seek internal and external harmony and balance. Internally, it is important to coordinate different the constituent individuals and the roles they play. Externally, it is difficult but equally important to coordinate and balance the conflicting aims and activities of different moral ecologies.
- Moral ecologies shape who we are and what we do. This is not to say that they determine us. But they do channel and constrain us. For example, your parents have not determined who you are. But much of what you do responds to how you have experienced them; you agree with them, refuse to question their authority, disagree with them, and rebel against them. The range of possible responses is considerable but these are all shaped by what you experienced from your parents in the past.
- The moral ecologies module (see the link provided above) describes three different moral ecologies that are important in business: quality-, customer-, and finance-driven companies. (More "kinds" could be generated by combining these in different ways: for example, one could characterize a company as customer-driven but transforming into a quality-driven company.) Roles, strategies for dissent, assessment of blame and praise, and other modes of conduct are shaped and constrained by the overall character of the moral ecology.
- Moral ecologies, like selves, can also be characterized in terms of the "centrality" of moral value. Some support the expression of moral value or certain kinds of moral value (like loyalty) while undermining or suppressing the expression of others (like courage or autonomy).
- Finally, think in terms of how personality traits integrated around moral value interact with different types of moral ecology. If a moral ecology undermines virtuous conduct, what strategies are available for

changing it? Or resisting it? If there are different kinds of moral exemplar, which pair best with which moral ecology? (How would a helper or craftsperson prevail in a finance-driven moral ecology like those characterized by Robert Jackall in **Moral Mazes**?

Moral Skills Sets

- Moral expertise is not reducible to knowing what constitutes good conduct and doing your best to bring it about. Realizing good conduct, being an effective moral agent, bringing value into the work, all require skills in addition to a "good will." PRIMES studies have uncovered four skill sets that play a decisive role in the exercise of moral expertise.
- **Moral Imagination**: The ability to project into the standpoint of others and view the situation at hand through their lenses. Moral imagination achieves a balance between becoming lost in the perspectives of others and failing to leave one's own perspective. Adam Smith terms this balance "proportionality" which we can achieve in empathy when we feel with them but do not become lost in their feelings. Empathy consists of feeling with others but limiting the intensity of that feeling to what is proper and proportionate for moral judgment.
- **Moral Creativity**: Moral Creativity is close to moral imagination and, in fact, overlaps with it. But it centers in the ability to frame a situation in different ways. Patricia Werhane draws attention to a lack of moral creativity in the Ford Pinto case. Key Ford directors framed the problem with the gas tank from an economical perspective. Had they considered other framings they might have appreciated the callousness of refusing to recall Pintos because the costs of doing so (and retrofitting the gas tanks) were greater than the benefits (saving lives). They did not see the tragic implications of their comparison because they only looked at the economic aspects. Multiple framings open up new perspectives that make possible the design of non-obvious solutions.
- **Reasonableness**: Reasonableness balances openness to the views of others (one listens and impartially weighs their arguments and evidence) with commitment to moral values and other important goals.

One is open but not to the extent of believing anything and failing to keep fundamental commitments. The Ethics of Team Work module (see link above) discusses strategies for reaching consensus that are employed by those with the skill set of reasonableness. These help avoid the pitfalls of group-based deliberation and action.

- **Perseverance**: Finally, perseverance is the "ability to plan moral action and continue on that course by responding to circumstances and obstacles while keeping ethical goals intact." Huff et. al.

Presentation on Moral Exemplars

https://cnx.org/content/m14256/

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Insert paragraph text here.

Moral Ecologies in Corporate Governance
(Caution! This module is still under development and changes are planned for the near future.) Recent work in moral psychology has established the profound impact that the context in which business is carried out has on business practices and practitioners. Moral ecologies are defined here as the various nested and overlapping social and organizational contexts that form the backdrop of human behavior and actions. This module is designed to help students identify different moral ecologies and design successful moral careers to respond to their special challenges. This module falls within the corporate governance unit of the courses Business, Society, and Government (GERE 6055) and Corporate Leadership and Social Responsibility (ADMI 3405). It has been developed through a National Science Foundation funded project, "Collaborative Development of Ethics Across the Curriculum Resources and Sharing of Best Practices," NSF-SES-0551779, also called the EAC Toolkit.
Word Version of this Template
https://cnx.org/content/m17353/

This is an example of an embedded link. (Go to "Files" tab to delete this file and replace it with your own files.)

Thought Experiment: Plato--The Ring of Gyges

The Ring of Gyges (Plato's Republic II, S359)
Gyges a poor shepherd is tending his flock when there is an earthquake. A hugh crack opens in the earth to expose a sarcopagus. Gyges reaches in and takes the ring that draws his attention. Later, when he is talking among friends, he notices that he becomes invisible when he turns the ring in toward himself. He tries this out a few times and then forms his plans. Invisible, he gains entry to the king's castle and rapes the queen. Drawing her into his nefarious plan, they kill the king and take over the kingdom. Gyges marries the queen and becomes ruler of a large and wealthy kingdom. Somehow it doesn't seem fit to say that he lives "happily ever after." But, since he is never caught, it doesn't follow that his ill-gotten gain has made him miserable.

Before finding his ring, Gyges was, at least outwardly, a well-behaved, just citizen. But the combination of vast power and no accountability drew Gyges over to the dark side. Does the human character, like that of Gyges, dissolve in the face of temptation and lack of accountability? Is the threat of punishment necessary to keep individuals moral? Is visibility and the threat of punishment all that stands between an individual and a life of injustice?

Thought Experiment: The Milgram Experiments

From 1960 until 1963, Stanley Milgram, a social psychologist, carried out a series of experiments on around 1000 subjects. Each experiment brought together three participants, a subject (or teacher), a learner, and an experimenter. In the initial orientation, the experimenter told the subject/teacher and the learner that they were about to participate in an experiment designed to measure the influence of punishment (in the form of electrical shocks) on learning. The learner was presented with information. The teacher then asked questions based on this information. If the learner answered correctly, then they went on to the next question. If the learner answered incorrectly, then he was given an electrical shock by the teacher. With each missed question the intensity of the shock increased. The experiment continued until all the questions were asked and answered.

However, these instructions constituted a deception brought upon the teacher/subject by the secret collaboration of the experimenter and the learner. The real purpose of the experiment was to determine how far the teacher/subject would go in turning against his or her moral views at the urging of an external authority. The learner feigned pain and suffering because there was no actual electrical shock. The learner also deliberately missed most of the questions in order to force the teacher to progress to higher and what appeared to be life-threatening levels of

shock. While teachers were not physically forced to continue the experiment over the feigned protests of the learners, whenever they tried to stop it, they were told by the experimenter that they had to continue to the end.

Before the Milgram experiments were carried out, a group of psychogists were asked to predict how many teachers/subjects would go all the way to the end and give the learner what they thought were life-threatening and highly painful shocks. The consensus was that most would stop the experiment early on when the learner first began to protest. But the actual results went contrary to these predictions. Over 60 percent of the teachers went all the way and gave the learner the maximum shock. You can read more about these experiments and how they have been interpreted by reading Milgram 1974 and Flanagan 1991. You Tube has several video vignettes on the Milgram Experiments. Simply type "Milgram Experiments" in the search window and browse the results.

Milgram argued that his research demonstrated a propensity to delegate moral authority for one's immoral actions to those in positions of power and authority. Others have pushed these results further to assert situationalism, i.e., the claim that forces arising in situations can overpower and annul the expression in action of self, character, and character traits. In addition to what Milgram claims, opponents of virtue theory would claim that Milgram's experiments offer conclusive proof that moral exemplars, i.e.,individuals who exhibit sustained moral careers through the strength of their characters and moral virtues, do not exist and cannot exist (See Gilbert Harmon). And setting forth these so-called moral exemplars as models imposes on students moral standards that are not minimally, psychologically realistic.

Thought Experiment: Zimbardo and the Standford Prison Experiment

In many ways, Zimbardo's experiments appear equally damaging to virtue and moral exemplar theory. Students were recruited to take part in a prison experiment. After being carefully screened for any abnormal psychological traits, they were randomly assigned the roles of prisoner guard and prisoner. The prisoners were arrested at their homes and taken to the psychology building at Stanford University whose basement had been made over to resemble a prison. The experiment was designed to last for two weeks but was halted mid-way because of its harmful impacts on the subjects. The guards abused the prisoners, physically and psychologically; individuals who behaved normally before the experiment, became sadistic when playing through the prison guard role. The prisoners were traumatized by their experience and many experienced breakdowns; all testified to how they forgot who they were before the experiment began; their normal identities were absorbed and cancelled by their new identities stemming from the role "prisoner" and from the dehumanizing treatment they received from the guards.

Just as the Milgram experiments have been used to demonstrate the weakness of character in the face of situation-based pressures, Zimbardo's experiments have been used to demonstrate the fragility of moral and personal identity. Powerful roles overwhelm moral integrity and conscience; individuals give way to the corrupting demands of immoral roles.

Nevertheless, Milgram and Zimbardo both pull up well short of this extreme position. Milgram talks of a former subject who used the knowledge he gained about himself as a subject in the obedience to authority experiment to strengthen his character and successfully take a leadership role in the protest movement against the Vietnam war. And Milgram also profiles two individuals who offered firm and resolute disobedience when asked to continue the experiment over the objections of the victim/learner. When the experimenter prompted Jan Rensaleer that he "had no other choice [but to continue]," he replied, "I came here on my own free will." Gretchen Brandt, a woman who spent her youth in Nazi Germany, responded similarly. To the same prompt she replied, "I think we are here on our own free will." During the post-experiment debriefing, both emphasized not giving over responsibility for their actions to others and acknowledged that their experience with the Nazis (Rensaleer lived in the Netherlands during the Nazi occupation) may have helped them in carrying out their acts of disobedience. In reflecting on her reason for disobedience, Brandt also added, "Perhaps we have seen too much pain."

Zimbardo also thinks that individuals can develop strategies, skills, and practices to keep hold of their moral selves in the face of strong situation and role-based pressures. These consist of exercises to gain distance and perspective on the situation and to recall oneself to one's character and personality. Here are some examples from The Lucifer Effect of his "Ten-Step Program:"453-454

- "I am responsible."
- "I will assert my unique identity."
- "I respect just authority but rebel against unjust authority."our second item here
- "I will not sacrifice personal or civic freedoms for the illusion of security."

From Gyges, Milgram, and Zimbardo to Moral Ecology
These thought experiments raise the question of the influence of environment on character and on individual agency. As we have repeatedly seen this semester, the environments of the organization (ethical, technological, organizational, and economic) all constrain agency in certain ways and enable or empower it in others. This module is designed to help you identify how the organizational environment creates a moral ecology that constrains and enables your ability to act. (You can be pressured to act against conscience as the Milgram experiments show. And you can lose your sense of self in a particularly power role and role-supportive environment.) It is also designed to suggest strategies that increase the strength of moral character by identifying different organizational environments (finance-, customer-, and quality-driven corporations)and calling upon you to develop special skills that help you to keep moral and personal commitments in tact.

Introduction

Corporate governance is defined in the Blackwell Encyclopedic Dictionary of Business Ethics as "concerned with those decisions made by the senior executives of a firm and the impacts of their decisions on various stakeholder groups." (EBE 147) This module turns corporate governance inside-out and looks at it from the perspective of the governed, that is, from the directors, managers, and employees subject to the structures and strategies of corporate governance. Corporate environments function as "moral ecologies," that is, "the somewhat stable, but constantly negotiated set of values, practices, and influences within societies, organizations, professions, and work groups." (Huff et. al., 2008) The thrust of this module is to help you begin to strategize on how to develop sustainable moral careers within different moral ecologies. You will study different kinds of moral ecologies using a taxonomy developed from the research of Michael Davis in **Thinking Like an Engineer** and Robert Jackall in **Moral Mazes**. Huff (2008) provides some generic strategies for individuals to pursue within in these organizational environments. But the exercises included in this module will encourage you to expand upon this list. Working through this module will help you to view corporate governance from within from the micro perspective of the individual. Another module will allow you to see corporate governance from the outside from the macro point of view.

What you need to know …

Personality Characteristics: The "Big Five" (plus one)

So much of success in practical and professional ethics lies in anticipating and defusing potential ethical challenges. Called "Preventive Ethics," this approach encourages you to develop the skill of uncovering latent or hidden ethical problems that could erupt into full-blown ethical dilemmas. "An ounce of prevention is worth a pound of cure." This module is designed to help you reflect on your personalty, different organizational environments or ecologies, and how your personality fits into these moral ecologies. Your success depends on developing plans for successful moral careers that respond to your personality traits and resist ethical challenges presented by organizational environments.

Personality Characteristics: Find your place on the continuum

1. Extraversion_____Introversion
2. Neuroticism_____Emotional Stability
3. Conscientiousness_____Carelessness.
4. Agreeableness_____Disagreeableness
5. Openness (to experience_____Closed (to experience)
6. Honesty/Humility_____Dishonesty/Arrogance

This account of personality modifies that presented by Huff et al in "Good computing: a pedagogically focused model of virtue in the practice of computing, parts 1 and 2."

Three Moral Ecologies

Type / Characteristics	Managers and engineers: role and participation	Centrality of ethics and values	Allocation of praise and blame	Withholding information	Treatment of dissent and DPOs
Finance-Driven	Managers play line role (=make decisions) Engineers provide technical information (=staff role)	Ethics and values are side constraints dealt with when they oppose financial considerations	Allocated according to hierarchical position: praise goes up and blame goes down.	Managers withhold to control and protect secrets. Engineers withhold bad news to avoid blame.	"Shoot the messenger!" Dissent = disloyalty and betrayal.
Customer-Driven	Managers make decisions on financial matters. Engineers "go to the mat" on engineering matters.	Ethics and values are not central but are still important.	Praise and blame are fairly allocated based on assigned responsibility and contribution.	Information not withheld but gaps arise because or role differences.	Differences occur but engineers are expected to advocate their perspective in decision making process.
Quality-Driven	Manager and engineering distinction drops out. Interdisciplinary work teams are empowered and responsible	Ethics and values are constitutive of the organization's identity.	Praise and blame are attributed to group and distributed to individuals within according to contribution.	Open consensus process ensures that needed information is integrated into decision making	Engineers and managers work toward consensus by gathering more information, continuing the discussion, and (as last resort) postponing the decision until consensus is reached.

Summary TableThis table and the explanatory material below summarizes materials from studies reported by Davis

(Thinking Like an Engineer) and Jackall (Moral Mazes). The reader should be aware that it departs somewhat from the strictly reported results in order to adopt the results to the idea of moral ecology. This later idea was introduced by R Park in **Human Communities: The City and Human Ecology**, Free Press, Glencoe, IL, 1952.

Breakdown of Table

- Moral ecologies can be categorized according to a series of considerations. The table above focuses on five.
- First, managers and engineers occupy distinct roles and participate differently in the decision making process. Managers play the **line** role. They collect information to make decisions that govern the day to day operations of the corporation. Engineers are hired as **staff** employees. They provide technical information to decision makers but do not participate directly in the decision making process. This raises difficulties when engineers, for technical or ethical reasons, disagree with the decisions taken by their managers. The line and staff roles channel decision making and constrain dissent.
- Moral ecologies can also be typed according to the centrality of ethical considerations in the corporation's goals, charter, operations, and even identity. Ethical considerations can range from (1) playing a **central** role, (2) to playing an important but subordinate role, (3) to being marginalized as irrelevant **side constraints**. The importance a corporation places on ethics colors all the other categories mentioned in the table above. If ethics is central to a corporation then it plays a central role in the decision making process, guides the allocation of praise and blame, determines the nature and amount of information shared in the decision making process, and determines how an organization treats dissent and disagreement.
- A corporation's conception of responsibility is revealed through the ways in which it allocates praise and blame. Significant differences arise between the way finance companies assign praise and blame and the ways these are allocated in quality or customer driven companies. Again, this related to the roles played by engineers and managers and the centrality of ethics in the corporation's governance.
- Ethical problems arise when crucial information is withheld from the decision making process. Hence, the flow of communication and the kinds of situations in which communication flow is disrupted helps to characterize a moral ecology. For example, the Hitachi report asserts that communication between managers and engineers breaks down predictably within finance-driven companies. This breakdown is grounded in the characteristics of the finance-driven moral ecology, especially in differences between the managerial and engineering roles and the extent to which managers and engineers participate in decision making.
- Finally, moral ecologies can be classified according to how they treat dissent and dissenting professional opinions. Dissent is less likely in quality than in finance-driven companies. While finance-driven companies treat dissent as disloyalty, quality- and customer-driven driven companies treat dissent as a stage in the process of reaching consensus.

Finance-Driven Companies

1. Finance-driven companies place financial objectives at the very heart of their constitutive objectives and corporate identity. For example, such companies are focused on maximizing returns for investors.
2. **Manager and Engineer Roles and Participation in Decision Making Process**: Managers play the line role in that they make the decisions that drive the day to day operations of the corporation. They bear responsibility for the consequences of their decisions and they are also responsible as the faithful agents of the company's directors. Being a faithful agent requires that one treat another's interests as one's own, maintain confidentialities, and avoid interests that conflict with the director. Engineers play the staff role, that is, they answer questions put to them by managers and are responsible for providing competent technical information. However, they do not participate directly in the decision making process, nor do they bear responsibility for the results of their manager's decisions.
3. **Centrality of ethics and values in the corporations decision making process**: Ethical considerations play only the role of side constraints in the setting of corporate policity and in the formulation and execution of its decisions. This means that ethical considerations are important only if they promote or interfere with the central, financial objectives. If appearing philanthropical is good for a corporation's image (and generates customers and profits) then the corporation appears philanthropic. If the corporation is likely to get caught in an ethical violation (excessive pollution) and this negative publicity will lower its prestige (and profits) then the corporation will not commit the violation. But in each case, the end is the promotion of financial objectives and the means are appearing ethical.

4. **Allocating Praise and Blame** Jackall goes into detail on how finance-driven corporations (and bureaucracies in general) assign praise and blame. The crucial factor is one's position in the corporate hierarchy. Praise works its way up the corporate ladder. If engineer Smith saves the company from a sever financial loss, then Smith's supervisor (or his supervisor's supervisor) gets the credit. However, if Smith's supervisor messes up, the blame passes down the corporate ladder to Smith. Praise moves up the corporate hierarchy, blame down.

5. **Information Exchange between Engineers and Managers**: In finance driven companies, managers withhold information from the engineers under their supervision for a variety of reasons. For example, if it is proprietary information, the manager may withhold all or part to prevent engineers from leaving the firm and revealing its secrets to a competitor. Managers may also use information to wield power and authority. By keeping engineers in the dark (like mushrooms) they effectively maintain authority and prevent dissent. On the other hand, engineers withhold bad news from their managers to avoid blame as well as the "shoot the messenger" syndrome. (When the incompetent general receives bad news from a soldier, he shoots the soldier rather than respond to the news.)

6. **Handling Dissenting Professional Opinions**: Dissent is interpreted as disloyalty in finance-driven companies. This organizational habit (maintained by managers to hold on to their authority) will even undermine DPO (dissenting professional opinion) procedures that look good on paper. A good DPO procedure communicates the opinion to several levels of supervisor, allows for the independent investigation of the merits of the opinion, and prevents retaliation against the professional asserting the opinion. But ruthless managers find ways to undermine such a procedure at all levels. Engineers may claim the right not to be held as scape goats to administrative incompetence. (See the Theory Building Activities: Rights module) This right may be supported on paper by a detailed DPO procedure. But it also has to be implemented at all levels and continually monitored.

Customer-Driven Companies

- Customer-driven companies focus on customer satisfaction. If the customer asks for or is satisfied with a lower quality product, then this is an acceptable result for this type of company as opposed to a quality driven company which would stand fast with the higher quality product.
- **Managers and engineers: roles and participation**: Managers make decisions on financial matters. But engineers are expected to "go to the mat" for engineering standards when these form all or part of the decision. Hence the distinction between managers (playing the line role) and engineers (playing the staff role) weakens, and engineers play a much more active role (advocates for engineering standards) in decision making. (Engineering standards include engineering ethics standards.)
- **Centrality of Ethics and Values**: While customer satisfaction plays the central role, ethical considerations are still important, especially regarding the ethical treatment of customers and reflecting the ethical values held by the customers. In many cases, it is difficult to distinguish quality and customer driven companies as the role ethical standards play gets closer to a central, constitutive one.
- **Allocation of Praise and Blame**: Responsibility in customer driven companies is tied closely to individual performance and contribution. This is because customer satisfaction is a more objective criterion than the internal political standards that dominate finance driven companies. Responsibility is closely alligned with contribution.
- **Withholding Information**: Information enhances control and responsibility. (The more you know, the more reponsibly you can act.) Since praise and blame are allocated according to contribution, there is less incentive to withhold information. If communication gaps arise between engineers and managers, these are much more likely to hinge on disciplinary differences. Engineers may have trouble communicating technical information to managers, or appear condescending by "dumbing down" the information. Managers may have difficulties communicating financial constraints to engineers who focus on quality standards. But these are minor, resolvable gaps.
- **Treatment of Dissent**: Dissent and disagreement are not only tolerated but actually expected. Managers expect engineers to advocate for issues in their sphere as they pertain to the decision making process. This process itself is adversarial because it is assumed that this is the best way to get all the information out on the table. Bad news and professional dissenting opinions are not interpreted as disloyalty; in fact, disloyalty lies in refusing to expose flaws in the choices proposed by one's supervisor. Managers expect their engineers to "go to the mat" when advocating technical positions based on their professional judgment.

Quality-Driven Companies

- Quality-driven companies stand out for the emphasis they place on achieving high engineering standards and on elevating the participation of the engineer in the decision making process. As is implied by the name, the central focus of these corporations is the achievement of high quality in products and services.
- **Managers and Engineers: Role and Participation**: In quality-driven companies, the distinction between the manager and engineering roles drops out. For example, while engineers play the staff role and provide expert engineering advice, they also participate fully in the decision making process. The locus of decision making moves from individual managers to small interdisciplinary groups. These groups, in turn, carry out consensus-based decision making procedures.
- **Centrality of Ethics and Values**: In quality-driven companies, ethics and values are central to the organization's objectives, charter, and identity. This has a decisive impact on the role of the engineer in the decision-making process. In customer driven companies, engineers are expected to advocate engineering and ethical standards precisely because these are not central to the organization's identity. But the centrality of ethical concerns in quality driven companies changes the engineer's role from advocacy to channeling technical expertise toward realizing ethical value.
- **Allocation of praise and blame**: In customer-driven companies, blame avoidance procedures no longer dominate the decision making process. In quality driven companies they disappear completely. Decisions are made by interdisciplinary groups in which engineers and managers participate fully and equally. Responsibility (praise and blame) then is allocated to the group. If it is distributed to members inside the group it is done so on the basis of contribution. But the primary target of responsibility ascriptions is the group, not the individual. And the response to untoward happenings is not targeting individuals and groups for blame but taking measures to learn from mistakes and avoiding them in the future.
- **Withholding Information**: The open, consensus-based decision process ensures that the needed information is brought forth and integrated into the decision. This results from removing a primary motivation to withholding information, namely, blame avoidance. Quality-driven corporations aggressively move to prevent untoward occurrences and, should prevention fail, make adjustments to ensure they do not reoccur. The motive to withhold information does not arise in this moral ecology.
- **Treatment of Dissent and DOPs (dissenting professional opinions)**: Engineers and managers work toward consensus by gathering information, discussing the problem and continuing the discussion until consensus is reached. Thus, dissent does not stand alone but is considered to be an essential and healthy component to the decision-making process. When consensus is not immediately reached, participants seek more information. If consensus is still not reached, the decision is postponed (if this is possible). The most viable strategy to reach consensus is to continue the discussion. For example, an engineer and manager might approach a supervisor; in this way they bring a new perspective into the decision-making process. They might consult other experts. The crucial point here is that disagreement (really non-agreement) is not a bad thing but a necessary stage in the process of reaching agreement and consensus.

Skill Sets

- The four skills described below are derived from studying the moral expertise displayed by moral exemplars. Each moral ecology will require the exercise of each of the skills described below. However, each skill has to be contextualized into the moral ecology. For example, reasonableness should not be exercised in the same way in a finance-driven company as it should be exercised in a quality-driven company. The reasonable exercise of dissent is manifested differently in an environment where dissent is equated with disloyalty than in one in which dissent is embraced as a necessary part of the consensus-reaching process. So your job, in constructing your moral careers within these different moral ecologies, is to contextualize the skill, that is, describe specifically how each skill should be practiced in each particular moral ecology.
- **Moral imagination** consists of projecting oneself into the perspective of others. It also includes multiple problem definitions and the ability to distance oneself from the decision situation to gain impartiality.
- **Moral creativity** is the ability to generate non-obvious solutions to moral challenges while responding to multiple constraints.
- **Reasonableness** consists of gathering relevant evidence, listening to others, giving reasons for one's own positions (arguments and evidence), and changing plans/positions only on the basis of good reasons.
- **Perseverance** involves planning moral action and responding to unforeseen circumstances while keeping moral goals intact.

Personality Traits

- **Extraversion**: Extraversion, which is paired with its opposite, introversion, has also been called confident self-expression, assertiveness, social extraversion, and power. An individual in whom this trait dominates tends to be assertive and out-going.
- **Conscientiousness**: Individuals with this trait are successful in carrying out tasks because they can discipline themselves to stay focused on a task. They are successful in the right moral ecology and tend to conform to the basic norms of their environment. This trait can lead to bad results if not guided by moral considerations.
- **Neuroticism**: This trait indicates a lack of emotional stability. According to Huff et al., "it is correlated with less effective coping and depression." Neuroticism has also been shown to interfere with the exercise of moral skills. Is there a particular moral ecology that can heighten the negative impacts of this personality trait?
- **Agreeableness**: According to Huff et al, this trait has also been called "social adaptability, likability, friendly compliance, and love." Again think about how this trait would operate within a finance-driven moral ecology as opposed to a quality-driven one.

Two Kinds of Moral Expertise

- Studies carried out by Chuck Huff into moral exemplars in computing suggest that moral exemplars can operate as craftspersons or reformers. (Sometimes they can combine both these modes.)
- Craftspersons (1) draw on pre-existing values in computing, (2) focus on users or customers who have needs, (3) take on the role of providers of a service/product, (4) view barriers as inert obstacles or puzzles to be solved, and (5) believe they are effective in their role.
- Reformers (1) attempt to change organizations and their values, (2) take on the role of moral crusaders, (3) view barriers as active opposition, and (4) believe in the necessity of systemic reform
- These descriptions of moral exemplars have been taken from a presentation by Huff at the STS colloquium at the University of Virginia on October 2006.

Skill sets, personality traits, and kinds of moral expertise are discussed in detail by Huff et al., "Good computing: a pedagogically focused model of virtue in the practice of computer, parts 1 and 2." These are published in **Information, communication and Ethics in Society**, Emrald Group Publishing Limited, Vol. 6, numbers 3 and 4 in 2008.

What you will do ...

In this section, you will learn about this module's activities and/or exercises. You will also find step by step instructions on how to carry them out.

Exercise 1: What we do when nobody is looking

- **You will be asked either to defend or criticize the following position on the nature and function of punishment**
- Entiendo que ser castigado es una manera de educar a la persona a cometió la falta y a la sociedad en general para que comprendan y entiendan que su conducta es una falta y afecta a la sociedad. En conclusión es una solución viable hasta el memento bastante efectiva siempre y cuando el castigo sea ejecutado de una manera prudente, saludable y dentro de lo que las leyes permiten.
- I understand that punishment educates both the individual at fault and society in general in order that they understand that their conduct is faulty and that it effects society. In conclusion, it is a viable solution and, up to the moment, sufficiently effective always and when the punishment is executed in a prudent and safe manner within what is permitted by the law.
- Restate this argument in your own words. (Try to shorten it by summarizing its key points.) Then discuss and clarify its key terms. Offer ethical and practical considerations in its defense.

Exercise 2: Milgram and Business

- **Continuing with the task in part one, you will be asked to either defend or criticize the following position on the meaning that the results of the Milgram experiments have for business administration**
- The Milgram experiments teach us that under the right conditions, anyone is capable of committing immoral activities. If a strong, dominant boss exists and has a weak, dependable employer, then the employer will out of necessity do whatever the boss wants.

- Many people are willing to commit immoral acts even though they know it is wrong if they know they are not being watched.
- It teaches us that many employees tend to do illegal works just because their managers ask them to so they assume they will be taking full responsibility for the situation even though it is unethical.

Exercise 3: Commentary Groups

- **Your job is to evaluate the arguments made by the teams debating in parts one and two. Be sure to focus on the argument and not the content of the position. Listen to their statements.**
- Do they base these on sound statements?
- What kind of ethical and practical principles (or values) do they use to make their case?
- Do their frame their position broadly or narrowly?

Exercise 4: Closure Groups

- **After listening to the debate and commentary, recap what has happened and discuss whether there are any conclusions that can be drawn from this activity**
- Do people agree or disagree about these 2 issues?
- If there is agreement, why does it exist?
- If there is disagreement, why does it exist?
- Is agreement possible? Why or why not?

Exercise 5

- Which moral ecology would you like to work in: finance-, customer, or quality-driven companies?
- Why? Specify your answer in terms of how the company allocates praise or blame, the centrality of moral concerns, the role given to professionals, the circumstances under which information is withheld, and the typical response to bad news.
- Why? What configuration of personality traits best fits within which moral ecology?

What did you learn?

This module was designed to help you visualize how to realize a moral career within three dominant moral ecologies. Apply these matters to yourself. Which moral ecology would be best for you? Of the two moral careers mentioned above, reformer and helper, which best fits your personality? Why? In other words, begin the process of visualizing and planning your own moral career.

Appendix

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This optional section contains additional or supplementary information related to this module. It could include: assessment, background such as supporting ethical theories and frameworks, technical information, discipline specific information, and references or links.

EAC ToolKit Project

This module is a WORK-IN-PROGRESS; the author(s) may update the content as needed. Others are welcome to use this module or create a new derived module. You can COLLABORATE to improve this module by providing suggestions and/or feedback on your experiences with this module.

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Theory-Building Activities: Virtue Ethics
This module provides activities that allow students to develop insights into the ethical approach commonly called virtue ethics. A previous module on moral exemplars has helped students to reflect on the characteristics and skills that make up individuals who consistently act for the good. This module builds on these insights and helps students identify and develop profiles for virtues pertinent to the occupational and professional domains. Students are provided with background information on virtue theory with emphasis on Aristotle's classical formulation and MacIntyre's recent attempt to see virtues as skills and traits cultivated to realize goods internal to a practice. In its original form, this module assigns virtues to small groups of 3 to 5 students. Students use a table format to "flesh out" their assigned virtue. Each group provides the others with copies of its virtue table. The result from students debriefing on their virtues and exchanging their virtue tables is a small virtue handbook that can be employed in subsequent decision-making exercises. This module is being developed as a part of an NSF-funded project, "Collaborative Development of Ethics Across the Curriculum Resources and Sharing of Best Practices," NSF SES 0551779.

Based on material presented by Chuck Huff (St. Olaf College) and William Frey at the Association for Practical and Professional Ethics in 2005 at San Antonio, TX. Preliminary versions were distributed during this presentation.

Module Introduction

This module uses materials being prepared for Good Computing: A Virtue Approach to Computer Ethics, to set up an exercise in which you will identify and spell out virtues relevant to your professional discipline. After identifying these virtues, you will work to contextualize them in everyday practice. Emphasis will be placed on the Aristotelian approach to virtues which describes a virtue as the disposition toward the mean located between the extremes of excess and defect. You will also be asked to identify common obstacles that prevent professionals from realizing a given virtue and moral exemplars who demonstrate consistent success in realizing these virtues and responding to obstacles that stand in the way of their realization. In a variation on this module you could be asked to compare the virtues you have identified for your profession with virtues that belong to other moral ecologies such as those of the Homeric warrior.

Three Versions of Virtue Ethics: Virtue 1, Virtue 2, and Virtue 3

Virtue ethics has gone through three historical versions. The first, Virtue 1, was set forth by Aristotle in ancient Greece. While tied closely to practices in ancient Greece that no longer exist today, Aristotle's version still has a lot to say to us in this day and age. In the second half of the twentieth century, British philosophical ethicists put forth a related but different theory of virtue ethics (virtue 2) as an alternative to the dominant ethical theories of utilitarianism and deontology. Virtue 2 promised a new foundation of ethics consistent with work going on at that time in the philosophy of mind. Proponents felt that turning from the action to the agent promised to free ethical theory from the intractable debate between utilitarianism and deontology and offered a way to expand scope and relevance of ethics. Virtue 3 reconnects with Aristotle and virtue 1 even though it drops the doctrine of the mean and Aristotle's emphasis on character. Using recent advances in moral psychology and moral pedagogy, it seeks to rework key Aristotelian concepts in modern terms. In the following, we will provide short characterizations of each of these three versions of virtue ethics.

Virtue 1: Aristotle's Virtue Ethics

- **Eudaimonia.** Happiness, for Aristotle, consists of a life spent fulfilling the intellectual and moral virtues. These modes of action are auto-telic, that is, they are self-justifying and contain their own ends. By carrying out the moral and intellectual virtues for a lifetime, we realize ourselves fully as humans. Because we are doing what we were meant to do, we are happy in this special sense of eudaimonia.
- **Arete.** Arete is the Greek word we usually translate as "virtue". But arete is more faithfully translated as excellence. For Aristotle, the moral and intellectual virtues represent excellences. So the moral life is more than just staying out of trouble. Under Aristotle, it is centered in pursuing and achieving excellence for a lifetime.
- **Virtue as the Mean.** Aristotle also characterizes virtue as a settled disposition to choose the **mean** between the extremes of excess and defect, all relative to person and situation. Courage (the virtue) is the mean between the extremes of excess (too much courage or recklessness) and defect (too little courage or cowardice). Aristotle's claim that most or all of the virtues can be specified as the mean between extremes is controversial. While the doctrine of the mean is dropped in Virtue 2 and Virtue 3, we will still use it in developing virtue tables. (See exercise 1 below.) You may not find both extremes for the virtues you have been assigned but make the effort nonetheless.
- **Ethos.** "Ethos" translates as character which, for Aristotle, composes the seat of the virtues. Virtues are well settled dispositions or habits that have been incorporated into our characters. Because our characters are manifested in our actions, the patterns formed by these over time reveal who we are. This can be formulated as a decision-making test, the **public identification test**. Because we reveal who we are through our actions we can ask, when considering an action, whether we would care to be publicly identified with this action. "Would I want to be publicly known as the kind of person who would perform that kind of action? Would I, through my cowardly action, want to be publicly identified as a coward? Would I, through my responsible action, want to be publicly identified as a responsible person? Because actions provide others with a window into our characters, we must make sure be sure that they portray us as we want to be portrayed.
- **Aisthesis of the Phronimos.** This Greek phrase, roughly translated as the perception of the morally experienced agent, reveals how important practice and experience are to Aristotle in his conception of moral development. One major difference between Aristotle and other ethicists (utilitarians and deontologists) is the emphasis that Aristotle places on developing into or becoming a moral person. For Aristotle, one becomes good by first repeatedly performing good actions. So morality is more like an acquired skill than a mechanical process. Through practice we develop sensitivities to what is morally relevant in a situation, we learn how to structure our situations to see moral problems and possibilities, and we develop the skill of "hitting" consistently on the mean between the extremes. All of these are skills that are cultivated in much the same way as a basketball player develops through practice the skill of shooting the ball through the hoop.
- **Bouleusis.** This word translates as "deliberation." For Aristotle, moral skill is not the product of extensive deliberation (careful, exhaustive thinking about reasons, actions, principles, concepts, etc.) but of practice. Those who have developed the skill to find the mean can do so with very little thought and effort. Virtuous individuals, for Aristotle, are surprisingly unreflective. They act virtuously without thought because it has become second nature to them.

- **Akrasia.** Ross translates this word as "incontinence" which is outmoded. A better translation is weakness of will. For Aristotle, knowing where virtue lies is not the same as doing what virtue demands. There are those who are unable to translate knowledge into resolution and then into action. Because akrasis (weakness of will) is very real for Aristotle, he also places emphasis in his theory of moral development on the cultivation of proper emotions to help motivate virtuous action. Later ethicists seek to oppose emotion and right action; Aristotle sees properly trained and cultivated emotions as strong motives to doing what virtue requires.
- **Logos** Aristotle's full definition of virtue is "a state of character concerned with choice, lying in a mean, i.e. the mean relative to us, this being determined by a rational principle, and by that principle by which [a person] of practical wisdom would determine it." (Ross's translation in **Nichomachean Ethics**, 1106b, 36.) We have talked about character, the mean, and the person of practical wisdom. The last key term is "logos" which in this definition is translated by reason. This is a good translation if we take reason in its fullest sense so that it is not just the capacity to construct valid arguments but also includes the practical wisdom to assess the truth of the premises used in constructing these arguments. In this way, Aristotle expands reason beyond logic to include a fuller set of intellectual, practical, emotional, and perceptual skills that together form a practical kind of wisdom.

Virtue 2

- The following summary of Virtue 2 is taken largely from Rosalind Hursthouse. While she extensively qualifies each of these theses in her own version of virtue ethics, these points comprise an excellent summary of Virtue 2 which starts with G.E.M. Anscombe's article, "Modern Moral Philosophy," and continues on into the present. Hursthouse presents this characterization of Virtue 2 in her book, **On Virtue Ethics** (2001) U.K.: Oxford University Press: 17.
- **Virtue 2 is agent centered.** Contrary to deontology and utilitarianism which focus on whether actions are good or right, V2 is agent centered in that it sees the action as an expression of the goodness or badness of the agent. Utilitarianism focuses on actions which bring about the greatest happiness for the greatest number; deontology seeks those actions that respect the autonomy of individuals and carry out moral obligations, especially duties. These theories emphasize **doing** what is good or right. Virtue 2, on the other hand, focuses on the agent's becoming or **being** good.
- **Can Virtue 2 tell us how to act?** Because V2 is agent-centered, critics claim that it cannot provide insight into how to act in a given situation. All it can say is, "Act the way a moral exemplar would act." But what moral standards do moral exemplars use or embody in their actions? And what moral standards do we use to pick out the moral exemplars themselves? Hursthouse acknowledges that this criticism hits home. However, she points out that the moral standards come from the moral concepts that we apply to moral exemplars; they are individuals who act **courageously**, exercise **justice**, and realize **honesty**. The moral concepts "courage," "justice," and "honesty" all have independent content that helps guide us. She also calls this criticism unfair: while virtue 2 may not provide any more guidance than deontology or utilitarianism, it doesn't provide any less. Virtue 2 may not provide perfect guidance, but what it does provide is favorably comparable to what utilitarianism and deontology provide.
- **Virtue 2 replaces Deontic concepts (right, duty, obligation) with Aretaic concepts (good, virtue)**. This greatly changes the scope of ethics. Deontic concepts serve to establish our

minimum obligations. On the other hand, aretaic concepts bring the pursuit of excellence within the purview of ethics. Virtue ethics produces a change in our moral language that makes the pursuit of excellence an essential part of moral inquiry.

- Finally, there is a somewhat different account of virtue 2 (call it virtue 2a) that can be attributed to Alisdair MacIntyre. This version "historicizes" the virtues, that is, looks at how our concepts of key virtues have changed over time. (MacIntyre argues that the concept of justice, for example, varies greatly depending on whether one views justice in Homeric Greece, Aristotle's Greece, or Medieval Europe.) Because he argues that skills and actions are considered virtuous only in relation to a particular historical and community context, he redefines virtues as those skill sets necessary to realize the goods or values around which social practices are built and maintained. This notion fits in well with professional ethics because virtues can be derived from the habits, attitudes, and skills needed to maintain the cardinal ideals of the profession.

Virtue 3

Virtue 3 can best be outlined by showing how the basic concepts of Virtue 1 can be reformulated to reflect current research in moral psychology.

1. **Reformulating Happiness (Eudaimonia).** Mihaly Csikcszentmihalyi has described flow experiences (see text box below) in which autotelic activities play a central role. For Aristotle, the virtues also are autotelic. They represent faculties whose exercise is key to realizing our fullest potentialities as human beings. Thus, virtues are self-validating activities carried out for themselves as well as for the ends they bring about. Flow experiences are also important in helping us to conceptualize the virtues in a professional context because they represent a well practiced integration of skill, knowledge, and moral sensitivity.
2. **Reformulating Values (Into Arete or Excellence).** To carry out the full project set forth by virtue 3, it is necessary to reinterpret as excellence key moral values such as honesty, justice, responsibility, reasonableness, and integrity. For example, moral responsibility has often been described as carrying out basic, minimal moral obligations. As an excellence, responsibility becomes refocused on extending knowledge and power to expand our range of effective, moral action. Responsibility reformulated as an excellence also implies a high level of care that goes well beyond what is minimally required.
3. **De-emphasizing Character.** The notion of character drops out to be replaced by more or less enduring and integrated skills sets such as moral imagination, moral creativity, reasonableness, and perseverance. Character emerges from the activities of integrating personality traits, acquired skills, and deepening knowledge around situational demands. The unity character represents is always complex and changing.
4. **Practical Skill Replaces Deliberation.** Moral exemplars develop skills which, through practice, become second nature. These skills obviate the need for extensive moral deliberation. Moral exemplars resemble more skillful athletes who quickly develop responses to dynamic situations than Hamlets stepping back from action for prolonged and agonizing deliberation.
5. **Greater Role for Emotions.** Nancy Sherman discusses how, for Aristotle, emotion is not treated as an irrational force but as an effective tool for moral action once it has been shaped and cultivated through proper moral education. To step beyond the controversy of what Aristotle did and did not say about the emotions (and where he said it) we place this enhanced role for emotions within virtue 3. Emotions carry out four essential functions: (a)

they serve as modes of attention; (b) they also serve as modes of responding to or signaling value; (c) they fulfill a revelatory function; and (d) they provide strong motives to moral action. Nancy Sherman, **Making a Necessity of Virtue: Aristotle and Kant on Virtue** (1997), U.K.: Cambridge University Press: 39-50.

Flow Experiences

- The psychologist, Mihaly Csikszentmihalyi, has carried out fascinating research on what he terms "flow experiences." Mike Martin in **Meaningful Work** (2000) U.K.: Oxford,: 24, summarizes these in the following bullets:
- "clear goals as one proceeds"
- "immediate feedback about progress"
- "a balance between challenges and our skills to respond to them"
- "immersion of awareness in the activity without disruptive distractions"
- "lack of worry about failure"
- loss of anxious self-consciousness"
- time distortions (either time flying or timeslowing pleasurably)"
- the activity becomes **autotelic**: an end in itself, enjoyed as such"

Virtue Tables

The table just below provides a format for spelling out individual virtues through (1) a general description, (2) the correlative vices of excess and defect, (3) the skills and mental states that accompany and support it, and (4) real and fictional individuals who embody it. Following the table are hints on how to identify and characterize virtues. We start with the virtue of integrity:

Virtue	Description	Excess	Defect	Obstacles to realizing the virtue in professional practices	Moral Exemplar
Integrity	A meta-virtue in which the holder exhibits unity of character manifested in holding together	Excess: Rigidity-- sticking to one´s guns even when one is obviously wrong(2,3)	Defect: Wantonness. A condition where one exhibits no stability or consistency in character	Individual corruption: Individuals can be tempted by greed toward the vice of defect. Lack of moral	Saint Thomas More as portrayed in Robert Bolt´s A Man for All Seasons. More

	even in the face of strong disruptive pressures or temptations			courage can also move one to both extremes	refuses to take an oath that goes against the core beliefs in terms of which he defines himself.
				Institutional Corruption: One may work in an organization where corruption is the norm. This generates dilemmas like following an illegal order or getting fired.	

Exercise 1: Construct Virtue Tables for Professional Virtues

1. Discuss in your group why the virtue you have been assigned is important for the practice of your profession. What goods or values does the consistent employment of this virtue produce?
2. Use the discussion in #1 to develop a general description of your virtue. Think along the following lines: people who have virtue X tend to exhibit certain characteristics (or do certain things) in certain kinds of situations. Try to think of these situations in terms of what is common and important to your profession or practice.
3. Identify the corresponding vices. What characterizes the points of excess and defect between which your virtue as the mean lies?
4. What obstacles arise that prevent professionals from practicing your virtue? Do well-meaning professionals lack power or technical skill? Can virtues interfere with the realization of non-moral values like financial values? See if you can think of a supporting scenario or case here.
5. Identify a moral exemplar for your virtue. Make use of the exemplars described in the **Moral Exemplars in Business and Professional Ethics** module.

6. Go back to task #2. Redefine your description of your virtue in light of the subsequent tasks, especially the moral exemplar you identified. Check for coherence.
7. Finally, does your virtue stand alone or does it need support from other virtues or skills? For example, integrity might also require moral courage.

Exercise 2: Reflect on these Concluding Issues

- Did you have trouble identifying a moral exemplar? Many turn to popular figures for their moral exemplars. Movies and fiction also offer powerful models. Why do you think that it is hard to find moral exemplars in your profession? Is it because your profession is a den of corruption? (Probably not.) Do we focus more on villains than on heroes? Why or why not?
- What did you think about the moral leaders portrayed in the **Moral Exemplars in Business and Professional Ethics** module?
- Did you have trouble identifying both vices, i.e., vices of excess and defect? If so, do you think this because some virtues may not have vices of excess and defect? What do you think about Aristotle's doctrine of the mean?
- Did you notice that the virtue profiles given by your group and the other groups in the class overlapped? Is this a problem for virtue theory? Why do our conceptions of the key moral values and virtues overlap?
- Did you find the virtues difficult to apply? What do you think about the utilitarian and deontological criticism of virtue ethics, namely, that it cannot provide us with guidelines on how to act in difficult situations? Should ethical theories emphasize the act or the person? Or both?
- The most tenacious obstacle to working with virtue ethics is to change focus from the morally minimal to the morally exemplary. "Virtue" is the translation of the Greek word, arête. But "excellence" is, perhaps, a better word. Understanding virtue ethics requires seeing that virtue is concerned with the exemplary, not the barely passable. (Again, looking at moral exemplars helps.) Arête transforms our understanding of common moral values like justice and responsibility by moving from minimally acceptable to exemplary models.

Moral LeadersThe profiles of several moral leaders in practical and professional ethics. Computer Ethics Cases This link provides several computer ethics cases and also has a description of decision making and socio-technical systems frameworks. Moral Exemplars in Business and Professional Ethics Profiles of several moral leaders in practical and professional ethics.

Presentation on Virtue Ethics

https://cnx.org/content/m13755/

I. Why Study Virtue Ethics?

Reasons

- It provides new insights into moral education
- Involves the whole self: attitudes, knowledge, skill, emotion
- It reorients moral theory toward excellence

II. Three Definitions

Elena Lugo

- "Las virtudes son disposiciones y rasgos del carácter del agente moral a la hora de ejecutar las acciones inherentes al ser persona.
- se trata de un punto intermedio entre dos extremos, ninguno de los cuales representa un valor moral, sino que más bien puede constituir un vicio o al menos carecer de excelencia
- no son meros rasgos del carácter que se operan automáticamente, sino respuestas deliberadas ante las situaciones concretas
- Lugo,E. (2002) Relación Medico / paciente: encuentro interpersonal ética y espiritualidad. Pontificia Universidad Católica de Puerto Rico: 88

Rosalind Hursthouse

- "A virtue such as honesty or generosity is not just a tendency to do what is honest or generous, nor is it to be helpfully specified as a "desirable" or "morally valuable" character trait.
- It is, indeed a character trait—that is, a disposition which is well entrenched in its possessor, something that, as we say "goes all the way down", unlike a habit such as being a tea-drinker —but the disposition in question…is multi-track.
- It is concerned with many other actions as well, with emotions and emotional reactions, choices, values, desires, perceptions, attitudes, interests expectations and sensibilities.
- To possess a virtue is to be a certain sort of person with a certain complex mindset."
- Hursthouse, R. (2007) "Virtue Ethics" Stanford Encyclopedia of Philosophy http://plato.stanford.edu/entries/ethics-virtue/

MacIntyre

- MacIntyre, a modern theorist, brings out the communitarianism in Aristotle
- **"A virtue is an acquired human quality the possession and exercise of which tend to enable us to achieve those goods which are internal to practices and the lack of which effectively prevents us from achieving any such goods.**

III. Virtues and Practices

Virtues are dispositions that bring about the internal and external goods around which a social or professional practice is built.
Constituents of a Practice

- **Participants**: Formed of individuals whose activities, attitudes, and goals are integrated, shared, or overlap in significant ways
- **Rules and Procedures**: Participants occupy roles which outline tasks and procedures. Roles in a practice are coordinated so that they combine to bring about complex ends beyond the capabilities of isolated individuals
- **Boundaries**: Boundaries such as disciplinary and theoretical principles surround practices and serve to distinguish one from the other

- **External Goals**: Engineering serves public wellbeing. Medicine health. Law justice. Business commerce.
- **Internal Goals**: Engineering has the internal goals of faithful agency (to client), collegiality (to peers), and loyalty (to the profession or practice itself)

IV. Developing Virtues for Practices

1. **Choose a virtue that is important for your occupation or profession. What goods or values does the consistent employment of this virtue produce?**
2. **Develop a general description of your virtue.** (Think along the following lines: people who have virtue X tend to exhibit certain characteristics (or do certain things) in certain kinds of situations. Try to think of these situations in terms of what is common and important to your profession or practice.)
3. **Identify the corresponding vices of excess and defect.**
4. **Identify the obstacles arise that prevent professionals from practicing your virtue?** Do well-meaning professionals lack power or technical skill?
5. **Identify a moral exemplar for your virtue.** Make use of the exemplars described in the Moral Exemplars in Business and Professional Ethics module.
6. **Does your virtue stand alone or does it need support from other virtues or skills?** For example, integrity might also require moral courage.

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Biofiltro Intermitente de Arena: Alternativa para tratar el agua en casa Caso de Estudio: Duchity, Haití

RESUMEN

La falta de agua segura es una de las principales causas de mortalidad en comunidades en estado de desarrollo alrededor del mundo. Es por esta razón que científicos, organizaciones gubernamentales y no gubernamentales, a través de los años han estado concentrando esfuerzos en la creación e implementación de alternativas apropiadas para reducir la incidencia de enfermedades causadas por agua contaminada y de este modo mejorar la calidad de vida de las personas. El biofiltro intermitente de arena, diseñado en 1900 por el Dr. Manz de la Universidad de Calgary en Canadá, es una tecnología apropiada para la remoción de turbidez y patógenos. Su simpleza de operación, su bajo costo y su funcionamiento sin la necesidad de energía eléctrica han hecho que hoy en día se encuentre implementado en mas de 70 naciones alrededor del mundo. Se estima que cerca de sobre 200,000 biofiltros intermitentes de arena han sido instalados a nivel mundial, impactando de manera positiva aspectos como la salud, la educación y el trabajo en sus usuarios.

Duchity es una comunidad localizada en Haití, de aproximadamente 8,000 habitantes, quienes carecen de un acceso a agua segura para ingerir y para uso domestico. Para el año 2013 cerca de 50 biofiltros de arena han sido instalados en la región con el propósito de mejorar el acceso a una fuente de agua segura de una forma fácil y de bajo costo, tomando en consideración los recursos de esta comunidad. El biofiltro intermitente de arena es un artefacto técnico, el cual es una adaptación del tradicional filtro lento de

arena, que aplica los mismos conceptos de filtración usados en las plantas comunes de tratamiento de agua, pero adaptado para ser usado en a nivel del hogar.

DESCRIPCION DEL ARTEFACTO

A. FILTRACION

El proceso de filtración ha sido utilizado desde hace más de 150 años como un paso importante en el proceso de tratamiento de agua en una planta municipal. La filtración se utiliza para separar las impurezas suspendidas o coloidales que se encuentran en el agua, con la ayuda de un medio poroso o granular, usualmente lechos de arena. Debido a la diferencia de tamaño entre las partículas suspendidas y coloidales que se encuentran en el agua a tratar y los espacios vacíos entre los granos, las partículas quedan atrapadas y son removidas permanentemente del agua. Este proceso, permite principalmente la remoción de partículas que afectan la calidad del agua como por ejemplo, la turbidez .

B. BIOFILTRO INTERMITENTE DE ARENA

El biofiltro intermitente de arena (BFIA) fue adaptado del tradicional filtro lento de arena con el propósito de poder ser utilizado el mismo concepto, pero en una escala mas pequeña y de forma intermitente en los hogares. Este especial diseño fue desarrollado por el Dr. David Manz de la Universidad de Calgary en Alberta, Canadá, para los años 1990. Los biofiltros intermitentes de arena fueron implementados por primera vez 1996 en Nicaragua. Su aceptación ha sido muy exitosa, por lo que hoy en día cerca de 200,000 biofiltros han sido implementados en mas de 70 naciones alrededor del mundo, impactando de manera positiva la vida de miles de familias.

1. Componentes del biofiltro intermitente de arena

El biofiltro intermitente de arena esta compuesto principalmente por siete componentes con una función especifica.

- *Caja de concreto*

La caja de concreto es el envase que le ofrece el soporte y contiene los materiales de filtración. Es una caja de cemento de una mezcla de hormigón, duradera y rígida con dimensiones de 37" de altura y un ancho de 12". Su peso es de aproximadamente 330 lb.

- *Arena de filtración*

La arena de filtración es el componente mas importante del BFIA. Este material debe de ser limpiado apropiadamente, para lograr el menor contenido orgánico posible y debe de ser tamizada para lograr separar un tamaño de partícula de 0.7 - 0.1 mm. El lecho de arena debe tener una altura de 21.4". La fuentes de la arena de filtración mas recomendada es aquella que proviene de roca triturada. En el caso donde este tipo de arena no este disponible puede utilizarse arena de río que no haya estado en contacto con el agua y en el peor de los casos, como ultima alternativa, se puede utilizar arena de playa. Estas dos últimas opciones deben de pasar por un proceso de limpieza y proveerle un periodo de exposición solar antes de ser utilizada, para remover la concentración de material orgánico que pueda estar presente.

- *Grava de separación*

La grava de separación tiene como función principal proveerle un soporte al lecho de arena y evitar que la arena sea arrastrada con el efluente del filtro. El tamaño de partícula necesario es de 6 - 0.7 mm. El espesor de la capa de drenaje debe de ser de 2".

- *Grava de drenaje*

La grava de drenaje tiene la misma función de que la grava de separación pero esta formada por partículas de mayor tamaño para evitar que las partículas entren al tubo de salida y la salida quede obstruida.

- *Difusor*

El difusor del biofiltro de arena, es una placa sencilla hecha de plástico corrugado, metal o acrílico, perforada para evitar un disturbio en la biocapa del filtro al momento de añadir el agua al biofiltro. Las perforaciones son hechas con un diámetro de 1/8" con una distancia de 1" entre cada perforación.

- *Tubo de salida*

El tubo de salida es un tubo plástico con un diámetro interno de ¾" y un diámetro externo de 3/8". El largo del tubo de salida es de 41". Este tubo debe de mantenerse en las mejores condiciones de limpieza para evitar la re- contaminación del agua que ha sido tratada previamente por el biofiltro.

- *Tapa*

La tapa del biofiltro de arena esta hecha de madera y tiene dimensiones de 12" x 12". La tapa debe mantenerse en su lugar en todo momento para evitar la entrada de animales y sustancias no deseadas al interior del filtro.

2. Funcionamiento del biofiltro intermitente de arena

El BFIA disminuye el nivel de turbidez y la concentración de patógenos en el agua, mediante la acción de cuatro mecanismos principales, atrapamiento mecánico, actividad biológica, adsorción y la concentración de oxigeno disuelto en el agua y nutrientes dentro del filtro.

- *Atrapamiento mecánico*

El atrapamiento mecánico es el mecanismo principal en el tradicional proceso de filtración. Este mecanismo se debe a la diferencia de tamaño entre las partículas suspendidas en el agua a tratar y los espacio entre los granos del lecho de arena. Debido a que el espacio entre los granos del lecho de arena es menor que el las partículas suspendidas en el agua, estas quedan atrapadas, logrando así una remoción de material suspendido. La remoción de las partículas suspendidas causa una reducción significativa en

el nivel de turbidez del agua y una remoción permanente de los microorganismos alojados en estas partículas.

- *Actividad biológica*

La actividad biológica del filtro se concentra mayormente en las primeras capas del lecho de arena (0.4 – 1 "). Varios microorganismos provenientes del agua que se le añade al biofiltro de arena se establecen en las partículas del lecho de arena promoviendo la formación de una biocapa. La biocapa es el mecanismo clave en el biofiltro de arena ya que es el principal responsable de la remoción de patógenos. La biocapa no puede ser observada a simple vista y su formación completa puede tomar hasta 30 días desde la instalación del BFIA.

- *Adsorción*

Las partículas suspendidas en el agua y los patógenos se unen entre ellos y se pegan a los granos de arena del lecho de arena de filtración mediante un proceso de atracción por diferencias en cargas.

- *Concentración de oxigeno disuelto en el agua y nutrientes*

La concentración de oxigeno disuelto en el agua y de nutrientes tiene una relación inversa con la profundidad del BFIA. A medida que la profundidad del filtro aumenta la concentración de nutrientes y de oxigeno disuelto en el espacio disminuyen. La disminución de ambas concentraciones hace que los microorganismos que se encuentran en el agua mueran, reduciendo así la concentración de patógenos activos en el agua.

3. **Operación del biofiltro intermitente de arena**

El biofiltro de arena opera de una forma fácil y sencilla, lo cual lo hace adecuado para ser utilizado por personas que no tienen un amplio conocimiento en el tema de la filtración. Las instrucciones para ser utilizados son las siguientes:

- Remover la tapa del biofiltro de arena y asegurarse de que el difusor del biofiltro este en su lugar.

- Añadir el agua a tratar (aprox. 5 galones) a la reserva del filtro.
- Esperar a que el agua deje de fluir por el tubo de salida.
- Esperar de una hora a 48 horas como máximo para añadir el próximo volumen de agua a tratar.

El biofiltro de arena no necesita ningún tipo de electricidad para operar ya que la fuerza necesaria para mover el agua a través de los lechos de arena y de la grava es ejercida por el diferencial en presión entre el tubo de salida y el nivel del agua en la reserva. El tubo de salida debe de estar específicamente colocado para que en el momento en el que agua deje de fluir, la distancia entre el lecho de arena y el nivel de agua de la reserva sea de 2". Esta zona de agua estancada permite la difusión de oxigeno del aire hacia la biocapa a través del agua mientras el filtro esta en el tiempo de espera entre tandas de agua a tratar, creando una condición aerobia apropiada para mantener en buenas condiciones los microorganismos establecidos en la biocapa.

Mantenimiento del biofiltro intermitente de arena

- Remover el difusor del biofiltro de arena y limpiarlo utilizando un poco de agua y un paño.
- Utilizando un dedo, se debe revolver el tope del lecho de arena con el propósito de que las partículas que quedaron atrapadas en esa área vuelvan a ser suspendidas en la zona de agua estancada.
- Con la ayuda de un envase o vaso se debe remover el agua de la zona estacada.
- Luego se coloca nuevamente el difusor en su lugar dentro del biofiltro de arena y el biofiltro esta nuevamente listo para ser usado.

El proceso de mantenimiento del biofiltro de arena puede afectar el funcionamiento de la biocapa, por lo cual se recomienda realizarle un post tratamiento al agua durante los primeros 7 a 15 días luego del mantenimiento.

SISTEMA SOCIOTECNOLOGICO

El biofiltro de arena ha sido implementado en varios países alrededor del mundo, siendo uno de ellos, Haití. Duchity es un pequeño pueblo de aproximadamente 8,000 habitantes, quienes carecen de un acceso a agua segura para ingerir y para uso domestico. En la comunidad hay establecidas seis escuelas elementares y cinco escuelas superiores. Para el año 2013, cerca de 50 biofiltros de arena han sido instalados en la región con el propósito de mejorar el acceso a una fuente de agua segura de una forma fácil y de bajo costo, tomando en consideración los recursos de esta comunidad.

- Alrededores

Los habitantes de esta región ubicada al sur-oeste de Haití, al día de hoy tienen varias fuentes disponibles de agua como por ejemplo, agua de lluvia y agua de río, siendo esta ultima la de uso más común. Algunas personas de la comunidad buscan el agua directamente a la fuente (río), especialmente las personas más jóvenes de la comunidad, mientras que otras personas, la mayoría, hacen el recogido de agua en un punto común mediante un sistema de tuberías llamado por los habitantes, los "pipes". La fuente principal de agua de los habitantes de Duchity, de acuerdo a los resultados obtenidos de pruebas de calidad de agua realizadas a finales del año 2012, esta contaminada con un alto contenido de microorganismos de origen fecal, causantes de enfermedades. Para buscar el agua al río, las personas comúnmente utilizan un balde de 5 galones, en la mayoría de las ocasiones, sin la limpieza adecuada para almacenar el agua.

El camino desde la comunidad hacia el río toma aproximadamente, en ir y venir, 2 horas ya que los caminos en dirección hacia el río son caminos no condicionados. Estos caminos tienen secciones rocosas, con alto contenido de vegetación y con varios niveles topográficos (no rectos ni tampoco nivelados) lo cual complica y hace más fuerte el trabajo requerido para buscar el agua. Muchas de estas personas no tienen varios envases ni espacio en sus hogares para almacenar el agua para varios días, por lo que caminan hacia a fuente de agua a buscar el agua para uso diario.

Los "pipes" los cuales son un punto de recogido de agua común, está compuesto por un sistema de tuberías el cual funciona totalmente mediante la acción de la gravedad, es el sistema que transporta el agua del río a un

punto más cerca de la comunidad. Este sistema se compone de dos tanques, uno cerca del río y el otro más cerca a la comunidad, y una línea de tuberías. Este sistema no ha sido reparado ni ha recibido ningún tipo de mantenimiento a través de los años causando así un deterioro del sistema. Solo fue reparado en una ocasión por el gobierno de Haití, en el cual se crearon secciones de tubería nuevas pero no se implemento ningún tipo de tratamiento al agua, fueron solo reparaciones físicas al sistema.

Debido a este deterioro, varios puntos de la línea de tubería se encuentran actualmente con problemas de derrames y exposición al ambiente, haciéndolos puntos potenciales de contaminación. En estos puntos a lo largo del sistema de tuberías también se realizaron pruebas de calidad de agua, las cuales reflejaron un alto contenido de contaminación de microorganismos de origen fecal. El punto donde este sistema de tuberías termina es un punto de libre acceso a la comunidad, por lo que la exposición al contagio de enfermedades entre personas de la comunidad en este punto puede ser extremadamente alta.

Algunos hogares de la comunidad tienen una línea de tuberías conectada directamente hasta sus casas. Estas personas pagan mensualmente cerca de 150 Goud mensualmente al comité de agua de la comunidad. Este comité de agua esta compuesto por personas voluntarias de la comunidad, quienes son los encargados de reparar daños que pueda sufrir el sistema utilizando principalmente el dinero recolectado de las mensualidades pagadas por los usuarios con conexión directa a sus casas.

Otra situación que enfrenta la comunidad de Duchity, es el acceso al servicio de energía eléctrica, ya que el generador que suplía energía eléctrica a las áreas comunes de la comunidad no ha estado funcionando desde hace varios años atrás.

- Personas

Varios sectores de la comunidad pueden verse afectados de diferente forma debido a la implementación del biofiltro de arena en la comunidad de Duchity. Los grupos de personas que pueden resultar beneficiadas por la implementación del biofiltro serian mayormente los usuarios, los técnicos y los manufactureros del biofiltro de arena. Los usuarios del biofiltro podrían

ser considerados como los más beneficiados de esta tecnología ya que tendrán disponible en sus hogares un sistema de tratamiento de agua lo cual reduciría los gastos de medicamentos por enfermedades causadas por agua contaminada, disponibilidad de agua segura en sus hogares y el control de manejar su propio sistema de tratamiento de agua, sin exponer el agua que utilizaran al contacto con otras personas. Tendrían un tecnología en sus casas por hasta más de 10 años (con el mantenimiento necesario) por un bajo costo, eficiente y fácil de usar.

Los técnicos y manufactureros del biofiltro de arena verían un aumento positivo en la cantidad de trabajo y ventas, generando ingresos a los manufactureros y más oportunidades de experiencia a los técnicos, ya que según lo investigado los técnicos no reciben un tipo de salario especifico, su trabajo, de acuerdo a uno de los técnicos principales que trabajan con esta comunidad, es voluntario. En adición a las oportunidades de experiencia, los técnicos recibirán educación sobre el proceso de filtración, lo cual puede ser beneficioso tanto en lo personal como en lo profesional, haciendo posible la cualificación para trabajos futuros.

Así como el biofiltro de arena puede traer beneficios a unos sectores de la comunidad también puede impactar de una forma posiblemente no deseada a otros sectores. Uno de estos sectores son los trabajadores de las estaciones de suplido de agua del gobierno de Haití. El gobierno tiene unos puntos de suplido de agua, un poco parecido a los "pipes", pero con la diferencia de que el agua ha recibido tratamiento previo. Es importante mencionar que este servicio no era gratuito hasta hace unos meses atrás. Este sistema funciona de la siguiente forma, la persona que necesita el agua llega hasta este punto con su envase y un empleado del gobierno o persona autorizada, quien esta bajo el control de la válvula de agua, le abre la válvula. El punto más cercano de estas estaciones de agua del gobierno toma un tiempo aproximado de 30 minutos en llegar. En el punto de suministro de agua del gobierno mas cercano, se realizaron pruebas de calidad de agua las cuales resultaron negativas para las muestras tomadas en el sobre flujo del tanque donde se almacena el agua tratada pero fueron positivos en el lugar donde el agua es suministrada, lo cual indica una contaminación a través de la tubería o en el mismo punto de suministro. Con la implementación del biofiltro a los usuarios les podría resultar más fácil tratar el agua en sus

hogares e incluso más seguro ya que no estarían expuestos al contagio de enfermedades a las que pueden estar expuestos en estos puntos, causados por otras personas que también buscan el agua en ese lugar, tocan la tubería por la que sale el agua y la contaminan.

Otro grupo de personas posiblemente afectadas con la implementación del filtro, son las personas usuarias del filtro de cerámica y sus manufactureros. Los filtros de cerámica son otra de las tecnologías de filtración que están disponibles en el mercado para tratar el agua en lugares como Duchity. El filtro de cerámica esta hecho de una mezcla de arcilla, plata coloidal y aserrín. La disponibilidad de este filtro podría causar una indecisión entre las personas de la comunidad de Duchity, sobre cual tecnología utilizar, el biofiltro de arena o el filtro de cerámica.

Hay varias características que podrían influir en esta decisión de cual filtro seleccionar como por ejemplo el mantenimiento, la vida útil y la facilidad de operación. Para el mantenimiento del filtro de cerámica, el filtro debe quemarse, lo cual es un poco más complicado y riesgoso que el proceso para el mantenimiento del biofiltro de arena. La vida útil del filtro de cerámica se estima que sea de 5 años, mientras que la del biofiltro de arena es de aproximadamente 10 años y sus materiales pueden ser reusables, con el tiempo los componentes del filtro pueden lavarse y exponerse al sol y volver a ser utilizados. A diferencia del biofiltro de arena el filtro de cerámica debe mantenerse completamente lleno para poder tener un flujo alto, lo cual requiere una adición de agua en intervalos de tiempo más pequeños que los que necesita el biofiltro de arena. Como resultado, los manufactureros del filtro de cerámica tendrían una competencia significativa por el mercado y los usuarios del filtro de cerámica podrían verse deseosos en cambiar de tecnología o lamentar el haber seleccionado el filtro de cerámica, o lo contrario.

- Procedimientos

La implementación del biofiltro de arena en la comunidad de Duchity, Haití requiere la transportación del los componentes de filtro desde Port-au-Prince, lo cual toma un tiempo de aproximadamente seis horas. El transporte del filtro puede ser complicado por varios factores. Uno de estos factores es el peso de los materiales del filtro y su tamaño. La caja de

concreto del filtro es de 37 pulgadas de altura y pesa unas 330 libras. El filtro con todos sus componentes tiene un peso total de 495 libras, por lo que su transporte requiere mucha fuerza y trabajo.

Otro procedimiento es el contactar a un técnico autorizado para el mantenimiento del biofiltro. El técnico autorizado que ha instalado gran parte de los biofiltros en Duchity reside gran parte de su tiempo en Port-au-Prince, por lo que la asistencia del técnico en la solución de los problemas que puedan surgir en con el uso del filtro podrían tardar un poco en resolverse. Este tiempo de espera muchas veces causa que la persona deje de utilizar el biofiltro.

Una de las recomendaciones del diseñador del filtro es el uso de una fuente de agua constante. El encontrar una fuente de agua constante, en ocasiones puede ser un poco difícil para las personas que viven en Duchity ya que el agua que están personas consiguen no siempre conserva parámetros de calidad de agua constantes.

- Leyes

El uso del biofiltro de arena ayuda a hacer valer el derecho humano aprobado por la Asamblea General de las Naciones Unidas en el 2010. El acceso a una fuente de agua segura es considerado un derecho humano básico ya que es un considerado factor esencial para el desarrollo y bienestar humano.

Los biofiltros de arena en muchas ocasiones son costeados por más de una familia o por una organización sin fines de lucro. En el caso en que el filtro sea comprado entre varias familias con el propósito de ser compartido, habrían que establecer acuerdos entre las familias sobre cómo se distribuirían los roles para operar el filtro así como también como se dividirán el volumen de agua tratado entre ellos los miembros de las familias involucradas. En el caso en que el filtro sea costeado por una organización sin fines de lucro, la organización establece como condición que el filtro debe de ser operado y mantenido en buenas condiciones, si esas condiciones no se cumplen, en al máximo dos de las visitas de cotejo, el filtro será removido del hogar.

- Conflictos

La implantación del biofiltro de arena en Duchity podría ocasionar conflictos sociales y conflictos de propiedad. Los conflictos sociales podrían estar relacionados con la forma en que las organizaciones sin fines de lucro eligen a las personas a las cuales les proveerán el biofiltro de arena. Si la organización sin fines de lucro no tiene la capacidad de proveer el filtro de manera que todas las familias de la comunidad puedan ser beneficiadas, las personas que no sean elegidas para ser ayudadas con el biofiltro podrían sentirse discriminadas, ya que unas personas estarían en ventaja sobre ellas. Los requisitos necesarios para que una familia o familias sean beneficiadas del biofiltro de arena deben de ser generales, ofreciéndole así la oportunidad de ser escogidos para esta ayuda a todas las personas por igual o de una forma al azar, la cual no permita el sentimiento de preferencia de unas personas sobre otras. De acuerdo a uno de los técnicos del biofiltro de arena entrevistados, el método utilizado por una de las organizaciones encargadas de proveer los biofiltros de arena libre de costo, es por orden de turno en una lista de espera. La persona o familias solicitan un filtro, esta persona se añade a una lista de espera y los filtros van siendo instalados según el orden de solicitud.

Otro de los conflictos que podrían surgir debido a la implementación del biofiltro de arena es el conflicto de propiedad entre las familias que comparten el biofiltro. Preguntas como quien es el dueño del biofiltro, quien toma las decisiones relacionadas con el filtro y como se asumirán las responsabilidades de los daños que puedan ocurrir por el uso del biofiltro por diferentes personas, podrían surgir y causar problemas en las relaciones entre las familias.

TECNOLOGIA APROPIADA

El biofiltro intermitente de arena es una tecnología apropiada para la reducción de niveles de turbidez y concentración de patógenos en el agua en hogares de comunidades como Duchity, Haití, por su simpleza de operación, bajo costo, utilización conceptos modernos, bajo esfuerzo para el mantenimiento, puede ser producido fácilmente por las personas, es ecológico y no requiere energía.

- Simpleza de operación

Para utilizar el filtro no es necesario un alto conocimiento en conceptos de filtración ya que el proceso es sencillo y no requiere mucha técnica. El usuario debe utilizar el filtro al menos una vez cada dos días y utilizar la misma fuente de agua.

- Bajo costo

El costo de biofiltro de arena lo hace accesible a las personas de Duchity. Su costo está entre 20 -25 dólares (US). Si una familia no tiene los ingresos suficientes para costear un biofiltro de arena existen alternativas para poder adquirirlo como por ejemplo, comprar el biofiltro de arena en conjunto con otras familias con el propósito de dividir el costo, o otra alternativa podría ser contactar a una organización sin fines de lucro que tenga el interés de ayudar con la compra de biofiltros y conseguir la ayuda para compra de esa forma.

- Utiliza conceptos modernos

El biofiltro de arena está diseñado en base a los conceptos tradicionales de filtración. Los mecanismo que hacen posible la reducción de turbidez y de la concentración de patógenos son los mismos que actúan en los tradicionales filtros de arena, los cuales son uno de los pasos esenciales en una planta de tratamiento convencional.

- Bajo esfuerzo para el mantenimiento

El mantenimiento del biofiltro de arena al igual que su uso, no requiere experiencia previa con sistemas de filtración. Tampoco es necesaria la compra de materiales adicionales, así como no requiere pagar dinero adicional para el mantenimiento del biofiltro. Estas características hacen el biofiltro adecuado para personas de bajo ingreso ya que el costo de inversión solo se hace una vez y luego solo resta hacer mantenimiento con esfuerzo físico leve.

- Producción fácil y viable

El biofiltro de arena puede producirse con el uso de materiales fáciles de procesar y siguiendo unas instrucciones sencillas las cuales están disponibles al público en general a través de organizaciones encargadas de trabajar con el biofiltro de arena. Actualmente el centro de manufactura de los biofiltros de arena está localizado en Port-au-Prince, a seis horas aproximadamente de Duchity, pero dado que la producción de los biofiltros no requiere el uso de maquinaria sofisticada, puede existir la posibilidad de establecer un centro de producción de biofiltros en Duchity o en una comunidad más cercana para resolver este problema, creando así trabajos para personas de la comunidad de Duchity y reduciendo los costos de transporte del filtro.

- Ecológico

Los materiales utilizados para la construcción del biofiltro de arena son básicamente arena, grava y concreto. La grava y la arena son materiales naturales los cuales solo requieren de lavados con agua y exposiciones al sol para prepararlos para su uso, por lo cual no afectan de ninguna forma el medio ambiente.

- No requiere acceso a energía eléctrica

El BFIA funciona solo por un diferencial en presiones entre el nivel del tubo de salida y el nivel de agua en la reserva, por lo que la energía eléctrica no es necesaria en ninguna cantidad ni en algún momento. Esta característica lo hace ideal para ser usado o considerado como alternativa para tratar en agua en comunidades donde no hay ningún servicio de energía eléctrica o donde el servicio no es accesible en todo momento.

CAPACIDADES

El biofiltro intermitente de arena actúa como un factor de conversión de capacidades humanas como vida, cuerpo saludable, afiliación, otras especies, control de su ambiente y pensamiento en funciones que aportan al bienestar humano de los habitantes de Duchity.

- Vida y Cuerpo saludable

El biofiltro de arena es una tecnología que puede evitar las muertes prematuras y puede contribuir a una vida mas digna reduciendo las enfermedades causadas por los patógenos que podrían estar en el agua y brindar el acceso a un ambiente más limpio. El agua producida por el biofiltro de arena es agua con niveles de contaminación lo suficientemente aceptables como para reducir significativamente los gastos económicos en medicamentos debido a la reducción del padecimiento de enfermedades. La oportunidad de trabajo y de progreso puede ser también impactada por el agua producida por el biofiltro de arena ya que una persona saludable puede trabajar de una manera más eficiente y productiva logrando así un desarrollo económico. El agua limpia producida por el biofiltro puede hacer también más digno e higiénico actividades diarias como lo son cocinar, bañarse y la limpieza del hogar.

- Afiliaciones

La tecnología del biofiltro de arena provoca la preocupación por el acceso a agua segura de otras persona. El compartir el equipo entre familias da la oportunidad de empatía y entendimiento entre las personas con la misma necesidad y situación de vida. La ayuda de los técnicos, los grupos comunitarios y las organizaciones sin fines de lucro hacia las personas necesitadas de un sistema de tratamiento adecuado como el biofitro de arena, estimula la preocupación por el bienestar del prójimo, cumpliendo con el deber social de hacer valer los derechos humanos.

- Otras especies

El biofiltro esta construido mayormente con materiales eco-amigables, que no afectan la naturaleza, ni generan desperdicios que puedan afectar la vida de otros animales o la contaminación del ambiente. Los componentes del filtro, la arena y grava, son materiales naturales y reusables. A pesar de que la vida útil promedio de un biofiltro de arena es de aproximadamente 10 años, los materiales pueden limpiarse, exponerse al sol para remover el material orgánico y volver a ser re-usados.

- Control sobre el ambiente

El deseo de mantener en buenas condiciones y en un estado funcional lo propio puede ser desarrollado por la posesión de un biofiltro de arena. La posesión de un biofiltro de arena le proporciona al usuario el control de manejar un equipo que puede impactar su salud y bienestar, así como también el biofiltro forma a ser parte de los bienes del usuario.

- Pensamiento

El acceso a un biofiltro de arena permite la oportunidad de educación sobre la calidad del agua, y el tratamiento del agua para hacerla segura a través de talleres. Esa educación con respecto a una técnica, como lo es la filtración, da paso a una generación de nuevas tecnologías que podrían ser desarrolladas por las personas que viven en Duchity, así como también la optimización del diseño actual según las necesidades de los usuarios.

REFERENCIAS

1. La información técnica del biofiltro intermitente de arena, así como también los diagramas utilizados en este escrito fueron obtenidos del manual de instalación del biofiltro intermitente de arena redactado por Cawst Center for Affordable Water and Sanitation Technology .

PRESENTACION

https://cnx.org/content/m48209/

Fora do Eixo

Introducción

La industria de la música siempre ha sido una industria muy lucrativa en la que solo algunos pueden entrar a formar parte de ella. Sin embargo, con el desarrollo de nuevas tecnologías, diseminación de conocimientos y la globalización han permitido que la industria evolucione. "La música, ese próspero negocio de algunos pocos que reinó durante casi cincuenta años en el mundo, cambió con la era digital…" --Guillermo Navarro.

En el sistema tradicional habían dos tendencias principales: la comercial y la independiente. En algunos lugares, la música independiente se conoce como "underground". Esto porque los que participan de los eventos "underground" son solo artistas independientes que están buscando abrirse camino en la industria de la música.

En Brasil, la industria musical era muy similar a las otras partes del mundo. Con las dos tendencias dominantes del sector comercial, el que generaba millones de dólares y el sector independiente que mayormente tocaba por amor al arte.

A principios del 2000, un movimiento innovador en la industria de la música, colocó a Brasil como uno de los países donde la evolución de la industria musical ha tomado un giro drástico y positivo –Fora do Eixo. El éxito de Fora do Eixo ha permitido que escena musical independiente genere R$ 44,000,000 al año. Esto es alrededor de USA $ 10,000,000. El éxito no solo se mide en cantidades económicas, el desarrollo cultural, la creación de propiedad intelectual, la transferencia de conocimiento y los sistemas suplementarios desarrollados han hecho que otros países miren hacia Brasil buscando un modelo sostenible para la música independiente.

Fora do Eixo nace de un problema común entre los artistas independientes, que es encontrar audiencia fuera de sus pueblos y ciudades locales. Por lo tanto, un numero de colectivos de diferentes ciudades se unieron con el fin de circular artistas. (Thompson, 2013).

Recientemente, en UN Convention Puerto Rico, se anunció que Reino Unido copiará el modelo de Fora do Eixo y lo llamarán Off-Axis. Es una traducción literal de Fora do Eixo que significa fuera del eje.

Método de intercambio

Al principio, al igual que en el inicio de la banca comercial, se anotaba en tarjetas cuando un artista adquiría un servicio donde pagaba parte en efectivo y parte lo pagaba en cubo. Realmente el cubo no existía cuando se comenzó con el sistema, lo que se hacía era una promesa de pago en especie. Era un intercambio de trabajo.

Crédito

Cuando alguien ofrece un servicio y le pagan en cubo, tiene un crédito para recibir un servicio o producto. Los créditos se van almacenando en forma de cubos dentro de una cuenta bancaría con moneda de cubo.

Deuda

Cuando se adquiere un producto o servicio se puede pagar parte en efectivo y parte con cubo. Esto es adquirir una deuda con promesa de pago futura a través de trabajo, servicio y/o producto.

Cubo

Cubo es la moneda oficial utilizada por Fora do Eixo. Cuando se asiste a un evento, las cosas se adquieren en cubo. Si entra un patrocinador al evento tiene que entrar con la moneda oficial del evento. Actualmente cubo funciona en moneda virtual con tarjeta ATM al igual que una Visa débito. Actualmente el valor de un cubo es R$ 1. Hay una paridad entre la moneda oficial de Brasil y la moneda oficial de Fora do Eixo.

Visto al Micro

Aumenta la base de seguidores/fan

Por lo general, cuando se hace un concierto grande, el artista anfitrión ("host") invita a otro artista que haga la apertura del concierto. Esto reduce la tensión de la audiencia y le da una ventana de tiempo al anfitrión para prepararse y ultimar detalles de camerino. Esto era así solo en la escena musical comercial. En la escena independiente se presentan muchas bandas o artistas en poco tiempo y no hay un anfitrión como tal.

Foro do Eixo aplicó la logística comercial en la escena independiente. Motivando a artistas independientes a ser anfitriones de conciertos y eventos donde inviten a otro artista a hacer la apertura. Esto permite que el artista invitado pueda adquirir una nueva fanaticada que venía a ver al artista anfitrión.

El artista anfitrión, por haber invitado a otro artista a tocar, entonces recibe la oportunidad de ir a hacer la apertura de un concierto en otro lugar que le permita aumentar su fanaticada.

Cuando un artista anfitrión permite que otro artista haga la apertura, recibe un crédito de 100 cubo. El artista que hace la apertura tiene un débito de 100 cubo. Para asegurar un intercambio justo, desarrollaron un sistema de verificación parecido a ebay.

Luego del evento, el artista anfitrión tiene que entrar a la plataforma de Fora do Eixo y certificar que el artista invitado hizo la apertura. De igual forma, el artista invitado tiene que entrar a la plataforma y certificar que realizó la apertura en el evento del anfitrión. Es entonces, después que ambos certificaron que se hace la transferencia de los 100 cubo del artista invitado al artista anfitrión.

Si el artista invitado no contaba con cubo suficiente en su cuenta entonces debe convertirse en artista anfitrión para cancelar la deuda que tiene de los 100 cubos.

El artista anfitrión se encarga de la promoción del evento, estadía del artista invitado, dieta y transportación local.

Descuentos

El artista que pertenece a Fora do Eixo es miembro de una red inmensa donde se consiguen servicios y productos a menores costos. En algunos casos el costo en efectivo (Reais de Brasil) es sustancialmente menos y la otra parte del costo se puede pagar con cubo.

Circulación

Cuando un anfitrión crea un evento pone a disposición la apertura del evento. Artistas o bandas de otras ciudades pueden solicitar para hacer la apertura. Luego, el artista que hace la apertura, se compromete a crear un evento en su ciudad donde permita que otro haga la apertura. Y se repite la dinámica indefinidamente. Esto permite una circulación artistas, técnicos, productores y promotores entre otros, que van viajando y conociendo nuevas ciudades y aumentado sus redes dentro de la industria.

Comunicación

Tanto la página de internet, la base de datos, los foros, la distribución de información por las cuentas de email, permite que la escena musical mejore su comunicación en cantidad y en calidad. La comunicación se extiende a toda la cadena de valor de la industria de la música que desee ser parte de Fora do Eixo. De esta forma, todos los afectados ("stakeholders") pueden formar parte activa en la exposición de problemas y la búsqueda de soluciones.

Distribución

Las redes que crea la circulación y la comunicación permite crear una cadena de distribución inmensa que se extiende por cada rincón de Brasil. La distribución se extiende a la moneda de Cubo, a la música, músicos, mercancía ("Merchandising") patrocinadores y "venues" entre otros. Para promover un evento dentro de Fora do Eixo es relativamente fácil a través de estas redes de distribución. Si alguna banda crea música o mercancía puede distribuirla a través de esta red.

Sostenibilidad

La constante investigación y generación de data de diferentes partes del país a través de las diferentes redes de comunicación permite un conocimiento profundo de la escena musical en cada lugar. Esto a su vez permite generar estrategias que al implementarlas mejoren la industria en toda su cadena de valor.

Vista al Macro

Generación de valor y propiedad intelectual

Gracias a las oportunidades que crea Fora do Eixo los músicos pueden dedicarse a hacer música. Al tener más opciones para tocar, opciones para grabar y distribuir, los música tienen la necesidad, porque hay la demanda, de crear nuevas letras y nuevas músicas. De esta forma un grupo grande en todo Brasil se mantiene ocupado creando valor al país. Para ser exactos, alrededor de 30,000 (Off Axis, 2013) artistas forman parte de Fora do Eixo en el 2012.

Nueva economía

El cubo ha creado una nueva economía dentro de la industria musical. Esta nueva economía que genera millones de dólares utiliza como moneda el cubo. Aunque para propósitos de esta investigación no se encontró información sobre si esta economía es tributable y si lo fuera no sabemos cómo.

Apoyo e Inversión local

Fora do Eixo nace de la gente para la gente, de la música para la música. Toda la inversión inicial en todos estos eventos, generación de productos y servicios, se hace con inversión local. Esto permite que las ganancias se retengan localmente.

Tráfico y transferencia de conocimiento

La circulación de artistas, promotores, técnicos y demás, más la audiencia que se mueve de una ciudad a otra crea un tráfico de personas, expertos y conocimientos que van viajando de ciudad en ciudad por todo Brasil. Este tráfico permite a la industria de la música crecer culturalmente, intercambiar información, ver nuevas tendencias y probar estilos y técnicas diferentes con grupos variados de personas. El enriquecimiento intelectual y cultural de la circulación sumado al tráfico de personas crea un empoderamiento de la industria y sus constituyentes.

Tecnología Apropiada

Factor de Conversión

Fora do Eixo funciona como un factor de conversión permitiendo que los "venues" tengan oportunidad de convertirse en localidades de eventos y conciertos, permite que los que tienen la habilidad de la música puedan tocar e interpretar para audiencias, permite a los que tienen la habilidad técnica servir como técnico y así consecutivamente a todos los miembros de la cadena de valor.

Fácil Uso

Utilizar y beneficiarse del artefacto-social es muy fácil. Tan solo hay que entrar a la página de internet registrarse y solicitar lo que se desea. Si el artista quiere tocar en otra ciudad puede ver los eventos y solicitar ser apertura del evento de su preferencia. De la misma forma el anfitrión puede anunciar que tiene un evento con apertura disponible.

Descentralización

Fora do Eixo elimina todas las barreras de entrada que tenía la industria de la música. Eliminó las casas productoras grandes del medio, el que quiera entrar a la industria ya no tiene que tocar las 3 o 4 puertas de las grandes productoras. Ahora puede entrar a la página y ser apertura de algunos eventos, comenzar a crear su fanaticada y hacer ventas a través de las redes de distribución. Ya no son dos o tres jugadores nada más, ahora con miles de personas distribuidas por todo Brasil las que se encargan de mover la industria de la música.

Protege valores

Para el artista, una de las mayores ventajas al ser independiente es que puede mantener control sobre la propiedad intelectual que el general. En la industria tradicional la casa productora o la compañía encargada de cobrar las regalías era quien tenía los derechos de autor y el compositor no poseía nada. Con el nuevo sistema el compositor y el artistas son los dueños de todos los derechos y pueden licenciarlos, venderlos, prestarlos o abrirlos a uso público bajo los "Creative Commons".

Distribución

Hay dos tipos de distribución interesante que juegan un papel interesante dentro del nuevo sistema riquezas y música. La distribución de las riquezas ha sido clave en este sistema. Si en un evento se obtienen ingresos altos, el anfitrión se queda con el 50% de los ingresos adicionales y el resto del 50% se redistribuye entre el resto de la cadena de valor involucrada en el evento. La distribución de música e información a través de las redes permite un acceso y diseminación a través de todo Brasil.

Trabajo intenso

El cubo obliga a los tenedores de deuda a trabajar. Esto hace que 30,000 artistas estén trabajando constantemente. Al incluir toda la cadena de valor es una fuerza trabajadora inmensa distribuida por todo el país creando valor constantemente.

Sistema Socio-Técnico para Fora do Eixo

Equipo	Programado	Afectados	Procedimiento	Leg
TarjetasComputadoras	MISBases de DatosServidoresWebsSocial Media Manager	**Gobierno** • Cultura • Economía • Hacienda • Banco Real • Transporte **Música** • Artistas • Productores/Promotores • Ingenieros • Empresarios • Uniones • Emisoras • "Venues" **Público** • Audiencia • Comerciantes	Registro en Fora do EixoBusca/Ofrece servicioConsume y adquiere deudaProvee y adquiere crédito	Con legi tran Púb ever Inte y B

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Poster

[missing_resource: http://cnx.org/GroupWorkspaces/wg2645/module.2013-12-04.6826253515/Screen%20Shot%202013-12-04%20at%204.46.07%20PM.png/image]Fora do Eixo Poster

ANÁLISIS SOCIO-TÉCNICO PARA EL DESARROLLO DE TMDLS DESDE UNA PERSPECTIVA DE MANEJO INTEGRADO DE CUENCA

The development and approval of TMDLs for Puerto Rico impaired water bodies have been increasing in recent years. However, the need to develop of new TMDLs remains. The process of TMDL development is today well understood and many approaches are considered valid and proven to model pollution load/stream response relations. Although several TMDLs has been approved by the USEPA for Puerto Rico and other areas in the United States, restoration of impaired water bodies is still pending or remains unreachable. This could be related to the feasibility, or unfeasibility, of approved TMDLs implementation plans. Feasibility of a TMDL implementation plan is closely related to the load allocation analysis. Then, the allocation processes requires special attention and a carefully selected methodology to ensure a reasonable and attainable implementation plan.

ANÁLISIS SOCIO-TÉCNICO PARA EL DESARROLLO DE TMDLS DESDE UNA PERSPECTIVA DE MANEJO INTEGRADO DE CUENCA

OSCAR H. MARTINEZ PINILLA
TABLA DE CONTENIDO

Definición y Propósito de un TMDL

Sinopsis
El desarrollo y aprobación de TMDLs para los cuerpos de aguas de Puerto Rico que no han cumplido con los estándares mínimos de calidad se ha ido incrementando en los últimos años. Sin embargo, la necesidad de nuevos TMDLs continúa. El proceso de desarrollo de TMDLs hoy en día es bastante conocido y entendido. Diferentes enfoques han sido considerados válidos para modelar relaciones de carga de contaminantes y respuesta de los cuerpos de agua a la contaminación.

calidad y deberán establecer un TMDL para cada cuerpo de agua por cada contaminante que exceda reiteradamente los máximos valores permitidos.

Los estándares de calidad de agua son establecidos bajo reglamentación estatal, y el límite o límites máximos pueden variar de Estado a Estado para cada contaminante. En Puerto Rico, la agencia encargada de establecer y velar por el cumplimiento de los límites permitidos para cada contaminante es la Junta de Calidad Ambiental (JCA).

El propósito de un TMDL es establecer la cantidad máxima de descarga de un determinado contaminante lo cual se establece a partir de la siguiente relación matemática:

$$TMDL = 3WLAi + 3LAi + MOS$$

3WLAi: Sumatoria de las asignaciones de carga para Fuentes Precisadas

3LAi: Sumatoria de las asignaciones de carga para Fuentes Dispersas

MOS: Margen de Seguridad (MOS, por sus siglas en inglés)

Aunque el planteamiento matemático aparenta ser sencillo, el trasfondo del TMDL tiene un componente social, ambiental y económico que requiere de un envolvimiento e interacción directa entre las partes envueltas. En efecto, la necesidad del desarrollo de estrategias de manejo basada en principios de manejo integrado de cuencas es necesaria para establecer un balance entre todos los factores y actores envueltos. Estos principios serán evaluados desde el enfoque de evaluación de un Sistema Socio-Técnico.

Antecedentes Históricos

El Clean Water Act (CWA, por sus siglas en inglés) estableció las bases para regular las descargas de contaminantes y los estándares de calidad de agua, en los cuerpos de agua superficiales de los Estados Unidos. Los fundamentos del CWA fueron establecidos en 1948 bajo la Federal Water Pollution Control Act, la primera ley de peso en los Estados Unidos que buscaba atender la contaminación de los cuerpos de agua. Estas iniciativas fueron continuadas con la Federal Water Pollution Control Act en 1956 y la Water Quality Act en 1965. En 1972, se promulgó la Federal Water Pollution Control Act la cual enmendaba y reorganizaba los aspectos principales de la ley existente del 1948. La ley enmendada en 1972 y sus posteriores enmiendas

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de 1977 y 1982, entre otras, son conocidas y referidas hoy día como Clean Water Act (CWA), o Ley de Agua Limpia (USEPA 2103a and 2013b).

Hasta 1995, la Sección 303(d) la cual establece la regulación de los TMDLs fue un componente casi ignorado de la CWA del 1972. Esto llevó a diferentes grupos a establecer demandas contra la USEPA a lo largo de varias cortes en los Estados Unidos. La regulación que actualmente establece el programa de los TMDL fue publicado en 1992 en la Parte 130 del Título 40 del Código de Regulaciones Federales (CFR, por sus siglas en inglés), Sección 130.7 (40 CFR 130.7).

En Agosto de 1999, la USEPA propuso cambios en las regulaciones existentes para clarificar y reforzar la jurisdicción de la USEPA sobre los Estados y Territorios, para implementar el programa de TMDL. Una reglamentación final que requirió a los Estados su responsabilidad sobre los TMDL fue emitida en Julio de 2000 y está en efecto desde Octubre 1, 2001. Según establece la CWA, cada Estado deberá reportar a la USEPA cada dos años un inventario de todos los cuerpos de agua, que debe incluir las condiciones generales y las tendencias de la calidad de agua de los cuerpos evaluados. Esta lista se conoce como la lista 305(b), según corresponde a la Sección del CWA que establece este requerimiento.

Adicionalmente, el CWA establece que los Estados deberán incluir en el reporte bienal (cada dos años), un listado de todos los cuerpos que se encuentran impactados y aquellos que no cumplen con los estándares mínimos de calidad de manera recurrente, según las normas y estándares de cada Estado. Esta lista se conoce como la lista 303(d), según corresponde a la Sección del CWA que establece este requerimiento. Ambas listas se pueden someter en un reporte integrado conocido como "Reporte integrado 303(d) y 305(b)", los cuales son sometidos por la JCA ante la USEPA por parte de Puerto Rico. Para cada cuerpo de agua donde los controles para la contaminación no son suficientes, un TMDL debe ser desarrollado e implementado por cada contaminante que esté excediendo recurrentemente los estándares aplicables de calidad de agua.

Metodología

DESARROLLO DE UN TMDL

ANALISIS DEL SISTEMA SOCIO-TÉCNICO DE UN TMDL

El proceso de desarrollo de TMDLs puede sintetizarse en cinco pasos principales finalizando con el establecimiento de una asignación de cargas máximas a cada componente (Fuentes Dispersas y Fuentes Precisadas) y un plan de implementación. El TMDL busca a reducción del exceso de carga de contaminante necesario para cumplir los estándares de calidad de agua para un contaminante específico. Después del desarrollo de un TMDL, el plan de implementación es importante para conseguir el propósito principal: la reducción del exceso de carga de contaminante y la recuperación de la calidad del cuerpo de agua.

Los cinco pasos del proceso de desarrollo del TMDL son (1) identificación del problema y establecimiento de metas numéricas basado en los estándares de calidad de agua; (2) evaluación de fuentes de contaminación y evaluación de carga de contaminantes; (3) establecimiento de un modelo que responda a la relación de flujo y carga de contaminante; (4) asignación de las cargas máximas permitidas por cada fuente; y (5) plan de implementación.

El desarrollo de TMDLs es una tarea compleja que envuelve un enfoque interdisciplinario donde el juicio científico es requerido en conjunto con las destrezas y conocimiento de profesionales en múltiples áreas de las ciencias ambientales, sociales y disciplinas técnicas. Este proceso asegurará que los estándares de calidad de agua se mantendrán permitiendo el desarrollo presente y futuro de las diversas actividades de desarrollo económico y social alrededor de los cuerpos de agua evaluados en el TMDL. Es importante por consiguiente, desarrollar los TMDL y su programa de implementación dentro de un concepto manejo integrado de cuenca. El desarrollo de un plan de manejo y desarrollo de cuenca implica la consideración de una cuenca como un sistema vivo y dinámico que interactúa alrededor de sus constituyentes, sus actividades socio-económicas y su relación con el medio ambiente.

La **Figura 1** muestra de manera sintetizada la metodología que se debe llevar a cabo como parte del proceso de desarrollo de un TMDL, incluyendo los cinco pasos de desarrollo y las tareas principales alrededor de cada etapa (USEPA, 2008b).

Figura . **Etapas del Desarrollo del TMDL (USEPA, 2008b)**

SISTEMA SOCIO-TÉCNICO DE UN TMDL

Desarrollo e Implementación TMDL: Cumplimiento de Calidad Agua Vs. Equidad
Un TMDL debe ser considerado como una herramienta o tecnología y no como un fin para cumplir con un requerimiento gubernamental. Por tanto, las estrategias de desarrollo e implementación deben ir de la mano con las necesidades y realidades de los constituyentes. Como se mostró anteriormente, en el desarrollo de un TMDL es importante el envolvimiento y reconocimiento de los constituyentes durante todas las etapas. Los TMDL vistos como un plan de manejo integrado de cuenca, deben ser un medio para resolver y prevenir problemas de calidad de agua que resultan tanto de fuentes dispersas como precisadas (USEPA, 2013c).

Sin embargo, el enfoque actual usado por la USEPA para recuperar un cuerpo impactado por contaminación en exceso, asignando cargas máximas a cada tipo de fuente no establece ni está basado en ninguna consideración económica. Sin embargo, la consideración de medidas para reducir la contaminación en las fuentes, tiene un impacto económico que no puede ser ignorado. En adición a lo anterior, desde un enfoque práctico y realista, asignar limitaciones de descarga a las fuentes de manera impositiva o unilateral, difícilmente tendrá acogida o será bien recibida por los constituyentes. Cualquiera de las condiciones anteriores, donde no se establece un reconocimiento de las realidades y necesidades de los constituyentes, anticipa el fracaso de cualquier programa de implementación. En este punto, se reconoce un reto complejo que solo puede ser resuelto bajo mecanismos de participación donde estén envueltas todas las partes.

Por tanto el desarrollo de un TMDL tiene un componente que envuelve los derechos y deberes de cada uno de los constituyentes. Por un lado, el derecho a tener un desarrollo de actividades de uso y disfrute de sus propiedades, y por otro el deber de proteger y evitar el deterioro de las condiciones saludables del medio ambiente. Es por tanto

en este punto donde se abre un debate de carácter moral y ético entre las partes, donde cada una debe asumir parte de su responsabilidad y reconocer que le corresponde tomar participación y asumir parte del costo de recuperar un cuerpo de agua que ya ha perdido sus condiciones mínimas de calidad para su uso.

3.2 Evaluación del Sistema Socio-Técnico de un TMDL

La evaluación del Sistema Socio-Técnico, para un TMDL visto como una metodología o una herramienta de planificación, se desarrolló a partir de varios componentes del entorno de sus fases de evaluación, desarrollo e implementación. Siendo un TMDL una herramienta que busca un mejoramiento o recuperación de los estándares mínimos de calidad agua, la **Figura 2** presenta el Sistema Socio-Técnico evaluado a partir de los componentes: (1) Tecnológico; (2) Entorno ético; (3) Entorno Físico; (4) Personas, Grupos y Roles; (5) Procedimientos; (6) Leyes, Estatutos y Regulaciones; y (7) Datos y Estructura de Datos.

Tecnología	Entorno Ético	Entorno Físico	Personas, Grupos y Roles	Procedimientos	Leye Esta Regu
Hardware:Equipos e Instrumentos de Monitoreo	Conflicto Moral: Calidad Agua Vs Equidad	Manejo Integrado de Cuenca: Extensivo a los límites físicos de la cuenca.	Habitantes y Componentes del Entorno: Comercios Locales, Industriales, Comunidades.	Reportes Bienales 303(d), 305 (b)	CWA Secc 303((b)
Código: Expresión Matemática del TMDL; Documentos reporte	Compromiso Social: Envolvimiento de los constituyentes	Escala de Análisis: Cuenca; Subcuencas; Nivel de detalle	Grupos de Interés: Autoridades Locales, Activistas Locales, ONGs	Estados deben definir sus prioridades de acción.(3,5)	JCA Están Calio Agua
Software: Modelos Matemáticos y de computadoras	Derechos: Ambiente Limpio	Subdivisiones: Límites geográficos, políticos, usos de terreno.	Agencias Estatales: JCA	Desarrollo del TMDL; Enfoque Multidisciplinario	USE NPD
Herramientas: Tecnología y Herramientas para Prácticas de Manejo (BMP)	Deberes: Todos las fuentes tienen responsabilidad		Agencias Federales: USEPA	Plan de Implementación	

Sistema Socio-Técnico de un TMDL

Es un TMDL una Tecnología Apropiada?

El TMDL como una herramienta de tecnología apropiada debe ser evaluado a partir de los siguientes elementos:

- Ambientalmente amigable
- De labor intensiva
- Energéticamente eficiente
- Conducente a la Descentralización
- Compatible con las leyes de la Ecología
- Hace uso de tecnología moderna
- Amigable en el uso de recursos

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Report and Poster

ANÁLISIS SOCIO-TÉCNICO PARA EL DESARROLLO DE TMDLS DESDE UNA PERSPECTIVA DE MANEJO INTEGRADO DE CUENCA
https://cnx.org/content/m49276/

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Bambú Tropical como Material Alternativo Para Construcción de Estructuras, Elaboración de Herramientas y Artesanía.

La escasez de recursos que afrontamos en el presente y su distribución no equitativa, ha aumentado la brecha de desigualdad y de pobreza entre los países del primer mundo y los que se identifican en vías a desarrollo. Por lo tanto nosotros los profesionales de la nueva generación, que nos encontramos comprometidos en la búsqueda de soluciones alternativas, entendemos que existe un gran potencial en la fusión de los conocimientos ancestrales con los conocimientos y tecnología de la ciencia moderna. A través de este este ensayo, enfocado en la tecnología apropiada, estaremos adentrándonos en unos de los recursos alternativos presentes y disponibles en los trópicos. El bambú más allá de un recurso natural, se estará presentado convertido a artefacto técnico y artístico. Este material representa para muchos de nosotros un recurso renovable, con una capacidad que trasciende de la conservación del medio ambiente. Este recurso, si es desarrollado integralmente, tiene el potencial de promover impulso a comunidades en sus posesos de autogestión, incentivar el desarrollo de industrias locales y/o aportar directamente a individuos que van en la búsqueda de la seguridad alimenticia. Por lo tanto este trabajo se suma a los múltiples esfuerzos internacionales de educar algún sector social acerca del bambú y su importancia como agente de cambio hacia un mundo más justo y armonioso.

Tema: Bambú Tropical como Material Alternativo Para Construcción de Estructuras, Elaboración de Herramientas y Artesanía.

- **Clasificación de Material**

Aunque en los procesos de implementación agro industrial el bambú se ve como una amenaza y molestia, en la visión de enfoque agro-ecológico este recurso representa un icono de la conservación y biodiversidad. El bambú en su estado natural es un componte orgánico y vivo, con función activa en la ecología de su entorno. Al mismo tiempo que este recurso estabiliza el terreno evitando su erosión, protege de evaporación excesiva a los cuerpos de agua, regula el contenido de humedad del suelo y como todo otro organismo vegetal, purifica el aire captando el gas carbónico y liberando oxígeno. Durante miles de años el bambú ha sido un componente indispensable para la formación y el desarrollo de civilizaciones orientales he indígenas. Por lo tanto, a pesar de ser un **Recurso Natural**, la gran cantidad de aplicaciones que se han derivado del mismo nos permiten clasificarlo como:

-**Artefacto Artístico**: Algunas variedades de bambú cuentan con la textura, geometría, tamaño, resonancia y manejabilidad adecuada para el desarrollo de instrumentos musicales, artesanías y adornos

-**Artefacto Técnico**: Dentro de las más de 1,200 especies diferentes de bambús podemos encontrar múltiples propiedades que nos permiten obtener textiles, alimentos, medicina tradicional, utensilios, herramientas, bio-combustible, carbón activado y una gran rama de materiales para construcción de estructuras y accesorios.

- **Descripción del Material**

El bambú es una planta perenne, proveniente de la familia gramínea/poaceae que se compone de individuos interconectados por un sistema de raíz común, rizoma, de hojas sujetas por una culmo/caña formada de nudos y entrenudos, de formación herbácea o leñosa. Algunas de estas plantas poseen la capacidad de crecimiento más veloz del mundo vegetal. Su distribución geográfica es muy amplia, estando presente en cuatro continentes y abarcando grandes regiones, desde el Pacífico Asiático, pasando por Australia, África y América, excluyendo Europa. Se expande desde los 51º Norte hasta los 48º Sur, y se puede encontrar tanto al nivel del mar como en cotas de hasta los 4000 metros s.n.m.(Hidalgo-Lopez, 2003)

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- **Descripción y Desarrollo de Material**

Independientemente que el bambú a ser aprovechado proceda de un bosque natural o una plantación productora, es indispensable entender su cíclico de vida y madures. A pesar que estas plantas emergen del suelo con el mismo diámetro que tendrá toda su vida y a los 7 meses de su brotar consiguen su altura,no es hasta su cuarto año de vida que logran su madures culminando su desarrollo físico-mecánico interno y su proceso de reproducción. Descartando la obtención de alimentos, textiles, celulosa y/o materia vegetal propagativa podemos establecer que para obtener materia prima de óptima calidad , derivada del bambú, es necesario poder identificar y aprovechar individuos que hayan podido completar su proceso de madures.

Similar a la caña de azúcar, maíz, arroz y otros, el hecho que el bambú sea una gramínea genera una producción y almacenamiento de almidones (azúcar) en sus paredes internas conocidas como parénquima. Además de que este material es orgánico y por lo tanto susceptible a agentes degradantes, el azúcar acumulado internamente genera que el bambú, luego de aprovechado, sea una fuente de alimento para ciertos insectos. Por ende, si se desea utilizar esta materia obtenida como fuente de un artefacto duradero, ya sea artístico o tecnológico, es indispensable pasar un proceso de preservación y secado adecuado.

Como mencionado anteriormente, dada que esta planta fue un recurso utilizado por nuestro ancestros, viene atada a ella una cultura de manejo biodinámico. Por ejemplo, tradicionalmente la cosecha de bambú se realiza en la fase menguante de la luna ya que la misma favorece que la savia de la planta, fluido que transporta los nutrientes y almidones, se concentre en sus raíces y no en su culmo. Adicional a esto, se ha establecido que las horas optima de cosecha, dentro del ciclo lunar ya mencionado, son las nocturnas. Durante el día, el bambú a través de la transpiración eleva agua y savia hacia toda la planta y durante la noche devuelve estos fluidos a sus raíces y suelo, momento oportuno para realizar el aprovechamiento.

El bambú es material hidroscopio y en su estado natural, recién cortado puede tener hasta un contenido de humedad de 150%, en algunas variedades(Hidalgo-Lopez, 2003). Para lograr utilizar la geometría natural del bambú es indispensable remover este contenido de agua a través de un proceso paulatino y transicional que evite rajaduras y deformaciones excesivas. Para evitar grandes cambios en las dimensiones del material, además de cosechar solo individuos maduros, es recomendable llevarlo hasta la humedad de equilibrio cual se consigue al momento en el contenido en humedad del materia es similar a la humedad relativa del ambiente a ser instalado.

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- **Enfoque y Avances del Material**

El auge que ha tenido el bambú en las últimas 3 décadas ha convergido en muchos avances dirigidos a los procesos de preservación, secados y manufactura. En la actualidad ya se pueden obtener muchos ejemplos de procesos industrializados para la preservación de este material con químico orgánico he inorgánicos, métodos de secados tecnificados y manufactura de materiales compuestos y derivados.

Independientemente al proceso aplicado, sea industrializado extensivo o rudimentario y artesanal, solo luego de haber cosechado, preservado y secado el bambú de manera correcta entonces podemos aseverar que contamos con un material de buena calidad. El bambú es un material con alta versatilidad y atreves del mismo es posible desarrollar innumerables aplicaciones. Pero estableciendo un enfoque de impacto social y práctico podríamos destacar que:

- La rápida razón de crecimiento y desarrollo de esta planta provee una fuente continua para obtención de materia prima, can la capacidad de ser sustentable.
- Dependiendo del proceso la elaboración de herramientas, artesanías y/o estructuras con bambú representan un bajo impacto al deterioro de los ecosistemas.
- La materia prima obtenida del manejo adecuado y sustentable del bambú, cuanta con las propiedades físico-mecánicas necesarias para establecer estructuras de manera sencilla, rápida y segura.
- La aplicación de técnicas adecuadas dirigidas a las construcción con bambú permite remplazar en muchas ocasiones grandes cantidades de materiales industrializados como el acero y hormigón.

- **Instrucciones básicas para uso de material**

Luego de asegurar comprender y saber aplicar los fundamentos del manejo sustentable del bambú es importante entender su lógica natural. La estructura de fibras internas del bambú, además de permitirnos extraer segmentos fácilmente, también genera condiciones de puntos frágiles. Por lo tanto hay una lista de conceptos básicos que se deben cumplir, o viceversa, al momento de montar estructuras, accesorios o herramientas hechas con bambú. A manera de ejemplo se muestra una guía desarrollada por el Ingeniero Colombiano Osar Hidalgo, pionero en la socialización de conocimientos acerca de este recurso:

- **Sistema Socio-Técnico**

Luego de haber definido, desarrollado y enfocado el conocimiento necesario acerca del bambú y sus usos, entonces estamos en posición para desarrollar el análisis socio técnico para este material. Este análisis estará enfocado en

Proyecto de Tesis: **Evaluación Físico Mecánica de Bambú Estructural Adaptado a Puerto Rico**, a través del programa de Ingeniería Estructural del departamento de Ingeniería Civil y Agrimensura de la Universidad de Puerto Rico recinto de Mayagüez.

A través de este trabajo de tesis se pretende identificar las variedades de bambús disponibles en Puerto rico con potencial para la construcción y establecer para cada una de ellas:

-información básica acerca de sus propiedades físicas como dimensiones, población por planta, alturas, etc.

-Información básica acerca de sus propiedades mecánicas como capacidades en compresión, tensión, flexión, cortante, módulo de elasticidad y de ruptura.

-Información básica en la efectividad de persevantes de bajo o ningún impacto a la ecología y salud humana.

-Una Base de Datos que fomente la educación hacia el manejo correcto y sustentable de los bambús disponibles en Puerto Rico y el Caribe.

- **Tabla Para Sistema Socio-Técnico**

Tecnología	Software	Entorno Físico	Partes Interesadas	Procesos	Leyes	Pro Inf
-Equipo Para realizar cosecha y muestras.- Equipo para probar capacidades físico-mecánicos de Bambú estructural.- Métodos de preservación y persevantes a ser estudiados.	-Sistema para Censo de población.- Programas numérico para análisis de datos.- Sistema estadístico para análisis de muestras.	-Bosques seleccionados para obtención de muestras para proyecto.- Facilidades del laboratorio de Ingeniería Estructural del Departamento de Ingeniería Civil de laUniversidad de Puerto Rico.	-Investigador y Comité de profesores para proyecto.- Estudiantes sub-graduados ayudantes-Finqueros y proveedores de muestras.	-Evaluación de la ecología de cada bosque a extraer muestra. (Proceso de Censo)- Trabajo de identificación y marcación de muestras-Elaboración de muestra a ser probadas.- Ensayo de muestras-Análisis de resultados y redacción de tesis.	-Manejo Sustentable de Especie.- ISO 22157-2004Manual Internacional para ensayo de bambú.- Revisión Literaria-Reglas para la investigación responsable.	-Pr par pro Pro Tes de Na par de Ric

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- **Trayectoria y Valor de Material**

A pesar que se desconoce el momento preciso en que se introdujo por primera vez el bambú en Puerto Rico, se conoce que durante la presencia del imperio español en la isla este recurso se utilizó para estabilizar taludes en nuevos caminos rurales

(Database, 2013). Pero no es hasta la década de los 1930, como parte de las investigaciones a través de la estación experimental tropical (TARS), ubicada en Mayagüez, del departamento de agricultura de los Estados Unido, que se introduce a la isla la colección más completa de bambú tropicales y templados

(USDA, 2013). Actualmente esta colección cuenta con más de 20 variedades de bambús tropicales provenientes diferentes regiones del globo. Independientemente que esta iniciativa del gobierno federal en su comienzo haya logrado establecer un taller, actualmente cerrado, para le elaboración de artesanías con este material e investigaciones básicas de las propiedades físico mecánicas del bambú introducido, al día de hoy estas colecciones permaneces en abandono y desuso.

En la actualidad la sociedad, economía y política puertorriqueña se encuentran en una crisis. Es muy posible que nuestro vínculo a las políticas globales de economías exógena impuestas a nuestro territorio, constituyan aún más nuestra dependencia a la importación de todo tipo de artículo sea doméstico, tecnológico, materia prima y el más ilógico de los casos alimenticios.

Si damos un vistazo al nuestro sector de la construcción podemos notar, que hemos adoptado un modelo de desarrollo y planificación desparramadora e insensible a los limitados recursos que nos rodean. El cemento, agregados, acero y los derivados del petróleo son los materiales protagonistas de la construcción tradicional y al mismo tiempo todos ellos se generan a través de un ciclo de explotación de materia prima, procesos industriales e intenso acarreo que conlleva unos altos consumos energéticos.

Como contraparte a este modelo se expone la bio-construcción cual se podría definir como un Sistemas de edificación o establecimiento de viviendas, refugios u otras construcciones, realizados con materiales de bajo impacto ambiental o ecológico, reciclados o altamente reciclables, o extraíbles mediante procesos sencillos y de bajo costo

(Wikipedia, 2013). En el presente existen muchas iniciativas para estandarizar técnicas de bio- construcción para lograr desempeños adecuados y seguros de estos sistemas antes eventos de diseño como terremotos y huracanes.

Como mencionado anteriormente el bambú tiene la capacidad como organismo de ser aprovechado sustentablemente, sus buenas propiedades físicas mecánicas permites la construcción de estructuras sismo-resistentes y su versatilidad como material ayuda a la elaboración de múltiples accesorios. La presencia de este

recurso en Puerto Rico representa una valiosa alternativa para reformar nuestra anticuada cultura de desarrollo. Por lo tanto lograr establecer una investigación científica que valide la capacidad estructural de esta materia prima adaptada a nuestra isla aporta grande mente con los esfuerzos multisectoriales que buscan la conservación del medio ambiente, recuperar la economía agrícola, y la independencia de importación excesiva.

- **Tecnología Apropiada**

Por medio de estos factores intentaremos establecer las posibles aportaciones del bambú como una tecnología apropiada:

- **Ecológicamente Amigable:** Además de que el bambú representa un componente activo en la ecología de su entorno, y en ante la agro-ecología es un componente de conservación de suelo y agua. Si este recurso tiene la capacidad de ser manejado sustentablemente con el fin de obtener gran cantidad de materia prima con múltiples aplicaciones

- **Bajo Costo:** Dado que el bambú es un recurso natural y existen aplicaciones que no requieres de ningún procesamiento industrial, podríamos establecer que algunas aplicaciones a este recurso son de bajo o ningún costo económico
- **Bajo-mantenimiento:** A pesar que este material orgánico sufre ataques por hongos, insectos y es degradado por el sol y el agua, la aplicación correcta del proceso de preservación, secado y montura podría establecer

productos de la larga duración y vida útil.

- **Labor Intensiva:** Dado que para obtener algún material útil de este recurso es necesario pasar por el proceso de cosecha, canteo, en ocasiones preservación y secado para la elaboración del mismo es entendible que se requiere de una labor muy intensiva.
- **Eficiencia Energética:** Para obtener materiales derivados o compuestos de bambú es necesario pasar por procesos industriales de alto consumo. Pero para obtener materiales crudos o no procesados solo se requiere de conocer los procesos rudimentarios adecuados, que ni de energía eléctrica requieren.
- **Simple, eficiente y non-violento:** Aunque la aplicación de fuerza y de herramientas que podrían ser peligrosas son indispensable para obtener alguna utilidad de este recurso, este proceso se puede definir como simple, eficiente y en ningún momento Violento.
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- **Conduce a la Descentralización:** Establecer o identificar plantaciones de este recurso permite a cierta escala la oportunidad de establecer infraestructuras de manera independiente con poca necesidad de otros suministros. Esta condición es factible desde una manera individual, comunitaria hasta a escala nacional.
- **Compatible con las leyes de la ecología:** Más allá de la aportación ecológica de este recurso, fomentar el uso sustentable del bambú como materia prima para la construcción disminuye la presión a los recursos madereros que se extraen de procesos de deforestación de selvas y bosques.
- **Uso de Conocimiento Moderno**: A pesar que la cultura para el manejo y la construcción con bambú vienen hatadas a un proceso milenario de aplicación. La aportación de los conocimientos modernos y de los procesos industriales permiten obtener materiales de mayor calidad, abre el horizonte a nuevas aplicaciones y facilita la producción de este material.
- **Uso Medido de los Recursos:** Dada la versatilidad de este producto en la actualidad somos capaces de obtener materiales útiles de todo la estructura del bambú.
- **Servicio a los humanos:** Independiente a las aportaciones del bambú a su entorno ecológico. Su aprovechamiento va dirigido al servicio de las personas y sus necesidades básicas.
- **Producción por las masas:** Como muchas de las técnicas dirigidas al trabajo con la naturaleza el único factor necesario para la participación activa en el proceso de producción, es comprender el conocimiento básico y práctico para el aprovechamiento del bambú.

Más allá de este análisis socio técnico considero fundamental mencionar que La Red Internacional de Bambú y Ratán, ha sido el organismo pionero en desarrollar y dirigir la utilización de este recurso como un agente de cambio en búsqueda de la armonía de las actividades de desarrollo humano con los sistemas naturaleza y su dinámica.

- **Potencial de Capacidad**

Utilizando como punto de partida la información presentada previamente, la tendencia de organizaciones que trabajan hacia un desarrollo social más justo, y las políticas gubernamentales que buscan implementar sustentabilidad humana en la utilización de recursos, presentamos el bambú como un recurso potencial de cambio.

Durante los periodos de escases de recursos como por ejemplo, el causado por las guerras mundiales, el gobierno imperial de Estados Unidos (Nuestro modelo

impuesto) presto una particular atención e interés en materiales renovable para construcción de infraestructuras. Estos materiales debían tener la capacidad de sustituir, a cierta escala, metales y otros materiales dirigidos para la producción de armas bélicas. Entre tantos, Por medio de este proceso se experimentó con el bambú como alternativa viable para desarrollar infraestructura. A pesar que hoy día aún existen grandes presiones bélicas, podemos adjuntar a nuestro panorama global, la fragilidad de la naturaleza causada por su explotación desmedida.

De cierta manera, la escasez de recursos que afrontamos en el presente ha aumentado la brecha de desigualdad y de pobreza entre los países del primer mundo y los que se identifican en vías a desarrollo. Por lo tanto nosotros los profesionales de la nueva generación, que nos encontramos comprometidos en la búsqueda de soluciones alternativas, entendemos que existe un gran potencial en la fusión de los conocimientos ancestrales y con los conocimientos y tecnología de la ciencia moderna.

El bambú representa para muchos de nosotros un recurso renovable, con una capacidad que trasciende de la conservación del medio ambiente. Este recurso, si es desarrollado integralmente, tiene el potencial de promover

impulso a comunidades en sus posesos de autogestión, incentivar el desarrollo de industrias locales y/o aportar directamente a individuos que van en la búsqueda de la seguridad alimenticia. Por lo tanto además de ser un sistema con acción ecológica también representa un modelo de cambio personal y social.

Sin ninguna intención de sobreestimar la capacidad de cambio de este recurso me atrevo exponer en los múltiples beneficios funcionales como:

- **Impacto Personal**: Más allá que dejar a un lado los esfuerzos de trabajo convencionales de la sociedad moderna, el incorpora actividades físicas dirigidas a el trabajo en y con la naturaleza proporciona un gran beneficio a la salud física, mental e incluso sentimental (tabú científico: espiritual) de cada persona. Usar el proceso de producción de bambú da el espacio a algunos individuos a un contacto más personal con la naturaleza que nos rodea.

Es válido también mencionar que además de los impactos físicos personales el proceso de incorporar el bambú a nuestro modelo de consumo y vida, también depende de un proceso de aculturación y aceptación.

- **Impacto Social:** Durante mucho tiempo se ha tenido la equivocación de que el bambú está protegido por las leyes de conservación establecidas por el departamento de recursos naturales. Una realidad ecológica de esta planta, es que la misma requiere de un manejo básico que permite su desarrollo de
- manera más óptima que la propia y natural. Por lo tanto la implementación de una cultura con más importancia al bambú, requiere de esclarecer las leyes y reglamentos en referente a su uso y manejo.

Durante los últimos 40 años de desarrollo, la construcción con bambú ha permanecido ignorada. Por lo tanto promover la misma actualmente requiere de un proceso integrado de tecnificación y normas de construcción que nos permita desarrollar los conocimientos básicos necesarios para el establecimiento de estructuras funcionales y seguras.

Más allá de la economía alterna que va implícita a este proceso de producción, establecer programas de incentivo para la producción de materiales derivados del bambú va atado a retomar la cultura del trabajo campesino y agrícola, cual ha permanecido nula en nuestra sociedad por más de 30 años.

Entrar en una cultura donde se nos incentive hacer usos apropiados de los recursos disponibles serviría como un propulsor de cambios que permitiría que las propias comunidades se empoderasen de sus procesos de desarrollo, creando más cohesión entre sus integrantes y estimulación de economías locales.

- **Impacto ecológico:** Poder establecer la importancia de los recursos naturales en función a su aportación social y personal, genera un mayor entendimiento acerca de lo indispensable que es su conservación y progresión. Formar economías alternas que utilicen la ecología como fuente de producción sustentable, en este caso, concluye con la concretización de ciclo que se ampara en los principios de la permacultura: Cuidado a la Tierra, Cuidado a los seres y redistribución justa de sus recursos.

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Poster Presentation

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